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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 22 1947

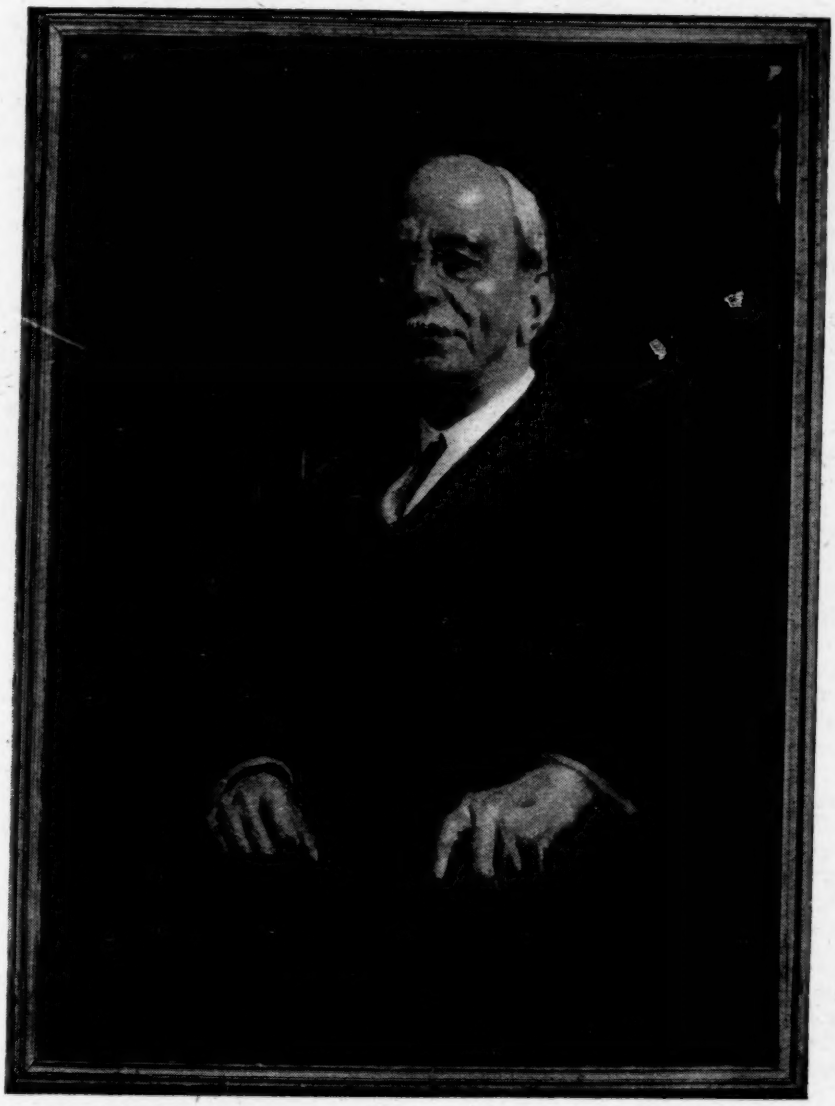
SHERRINGTON'S IMPACT ON NEUROPHYSIOLOGY*

BY

JOHN F. FULTON, M.D.

Professor of Physiology, Yale University

It has been said that *The Integrative Action of the Nervous System* ranks in importance with Harvey's *De Motu Cordis*, for it, like the classic on the circulation, marked a turning-point in the history of physiological thought. The new printing of Sherrington's great monograph, which appeared earlier this year at the time of the Seventeenth International Physiological Congress, has served to remind the physiological world not only that Sir Charles is still following the main currents in the field—as is brilliantly indicated in his foreword to the new printing—but that he has retained his youthful outlook and the crisp critique which his friends and admirers have always learned to expect from his pen.



Portrait of Sir Charles Sherrington, O.M., in the possession of the Royal Society. Sir Charles Sherrington is 90 on Thursday, Nov. 27.

His Early Work

An appraisal of his many contributions to neurophysiology and his position in the history of the subject is no easy task, for Sherrington has touched upon so many of its important phases. He began to publish in his late twenties. His first paper, which was issued in conjunction with J. N. Langley in 1884, had to do with the degenerations in the medulla oblongata and the spinal cord of one of the decorticate dogs which had been exhibited by Goltz at the International Medical Congress of 1881. Thereafter, and until the beginning of the Second World War in 1939, he continued to publish papers and books, his titles averaging from one to fifteen a year. There are few parallels in the history of medical literature to such sustained productivity. His output appeared to drop off during the war years, when he was engaged on two monumental works of scholarship—*Man on His Nature* and the biography of the sixteenth-century French physiologist and physician Jean Fernel which was issued by the Cambridge University Press in 1946—works that have brought him widespread acclaim.

Although his first paper had to do with the nervous system, Sherrington did not immediately confine his attention to this field. In 1885 he accompanied C. S. Roy and J. Graham Brown to Spain to observe an epidemic of Asiatic cholera. The following year he went to Italy on a similar mission and took the necropsy material to Berlin, where he began to cut the sections in Virchow's laboratory. After two unsatisfactory months Virchow, who was then chiefly interested in politics, looked into Sherrington's work and sent him to the laboratory of Robert Koch, where he took the prescribed six-weeks preliminary course in technique and eventually stayed with Koch for nearly a year (1887). During this time he attended Waldeyer's lectures in histology. On these various trips to the

*The first of three invited contributions to celebrate the ninetieth birthday of Sir Charles Sherrington on Nov. 27.

The portrait, painted by the late Mr. R. G. Eves, R.A., is reproduced by the kind permission of the Council of the Royal Society.

Continent he also worked under Goltz at Strasbourg in 1885 and again in 1895, and he spent a month with Pflüger at Bonn.

Sherrington's clinical work had been done at St. Thomas's Hospital, where he was appointed Lecturer in Physiology. In order to support himself, however, he became, in 1891, professor and superintendent at the Brown Institution, a veterinary hospital of the University of London financed by those concerned with the prevention of cruelty to animals. Sherrington believed that when an animal had mercifully to be put away it might serve the interests of its fellow creatures if observations could be made upon its basic physiological functions while under terminal anaesthesia. Such was his tact in persuasion and such was the confidence he inspired that he was permitted to conduct the affairs of the experimental laboratory almost completely unmolested. Here it was that he began his classic studies on motor and sensory segmentation. In analysing the distribution of the ventral nerve roots he laboriously stimulated each ventral root from the first cervical down to the last sacral and recorded which muscles were thrown into action. Although begun on cats and dogs, this work was later extended to the monkey; and the observations on the monkey were found closely applicable to the human subject. The *sensory* dermatomes were similarly mapped by studying the "area of remaining sensibility" when three dorsal roots above and three below the dermatome under study were severed. Once again he included all dermatomes from the high cervical to the sacral, and the sensory maps that resulted have proved the basis of all later work on sensory levels, both of man and of animals.

A Classic of Modern Physiology

It was while engaged in these studies that Sherrington became interested in the sensory nerves to muscle, and in a paper published in 1894, "On the Anatomical Constitution of Skeletal Muscles," he laid the foundation of our knowledge of what he later termed the "proprioceptive" system. Prior to 1894 anatomical textbooks had tacitly assumed that all nerves going to muscle were motor nerves. With his characteristic habit of studying anatomical relations first (and then attempting to turn his anatomical facts into physiological language), Sherrington found that when dorsal root ganglia supplying nerves passing to a given muscle were removed a large proportion of the nerve fibres of the muscle nerve in question degenerated. He concluded that one-third to one-half of the nerve fibres passing to skeletal muscle nerves are sensory in character. What then, he asked, are the functions of the afferent fibres originating in skeletal muscle?

At that time it had not been established that the various highly differentiated endings, such as the muscle spindles and the other end-organs described by Ruffini and Golgi, were actually sensory in nature. Sherrington severed the ventral nerve roots supplying a particular muscle and reported: "In muscles from which all motor fibres have been entirely removed by degeneration I have never in a single instance failed to find every spindle met with in the muscle still possessed of perfectly sound myelinate nerve fibres. These myelinate fibres are traceable from sensory roots, and penetrate into the spindles and terminate within them." On the other hand, when he deganglionated the dorsal roots at corresponding levels all muscle spindles and Golgi tendon organs degenerated and disappeared.

This paper, as does that on decerebrate rigidity which appeared in 1898, stands as one of the classics of modern physiology. It led Sherrington at once to study the effects in animals of severing the dorsal nerve roots. He found that the cutaneous nerves of a cat's paw could be completely severed and the animal would suffer no locomotor deficit. Indeed, the cat could walk up the rungs of a sloping ladder and drink a bowl of milk at the top of it without experiencing any difficulty, even though its paws were completely numb. If, on the other hand, the extremities were de-afferented by dorsal root section, the animal, although still possessing motor power, was ataxic in the extreme and was quite unable to negotiate the sloping ladder. Study of the animal's behaviour made clear that it had lost all awareness of the position of the extremities in space. Further examination revealed that tendon reflexes, such as the knee-jerk, were lost, and this incidentally served to establish the fact that the knee-jerk was a true reflex. These studies also shed important light on the clinical condition of tabes dorsalis, in which ataxia develops as a result of impairment of sensory pathways at the dorsal root level.

While the work on the dermatomes and sensory nerves to muscle was progressing Sherrington was also studying the reflexes observable in the spinal and also in the decerebrate state. The celebrated series of papers on reciprocal innervation of antagonistic muscles began to appear in 1893 and continued until after the turn of the century. It was the analysis of the reflex behaviour of antagonistic muscles that led him to the concept of integration. By 1895 his papers had attracted such wide attention that he was called in that year to the Chair of Physiology at Liverpool, where he remained for eighteen years until he went to Oxford in 1913. Before leaving the Brown Institution he had begun to study the motor cortex of monkeys, but since his observations were in rather sharp disagreement with those recorded a few years earlier by Sir Victor Horsley he at first published them only in preliminary form. Sherrington's painstaking map of the motor area had indicated sharp restriction of the motor foci to the precentral convolution, and only when very strong stimuli were used could responses be obtained from the postcentral convolution. The more diffuse maps which Horsley had published Sherrington believed to be due to spread of stimulating current.

His Silliman Lectures

These early phases of Sherrington's work culminated in his Silliman Lectures at Yale University, delivered in 1904 and issued in 1906 under the title already mentioned, *The Integrative Action of the Nervous System*. Here we find a host of new terms and phrases that have become household words in modern neurophysiology. He had introduced the term "synapse" when writing for Sir Michael Foster's *Text-Book of Physiology* in 1897, but the word did not really take hold until the Silliman Lectures had been published. The term "proprioceptive" was also given general currency in the Silliman Lectures, as was the related term "nociceptive." The cerebellum he described as the "head ganglion of the proprioceptive system."

The influence of *The Integrative Action* proved to be far-reaching in many spheres. The chapter on the motor cortex contained the first general summary of Sherrington's studies on stimulation and ablation of discrete areas. He pointed out that in chimpanzees, orangs, and gorillas the foci of motor representation were arranged in accordance with a definite pattern and that the same general pattern must obtain in the human being. He stressed the fact that the finer movements of the digits had a greater area of representation than the coarser movements such as hip flexion; and by the same token that lesions of the motor area caused greater deficit for finer movement patterns of the digits than for the coarser movements of hip

and shoulder. It is not surprising, therefore, that movement patterns having the least representation in the cortex were the first to recover after a cortical lesion. These observations proved immediately applicable in accounting for the clinical picture of hemiplegia in man, where recovery of motor function proceeds from the proximal to the more distal musculature—i.e., the hip muscles commonly recover motor power before the knee and the knee before the ankle.

Work on Decerebrate Rigidity

"The integrative action" also revived the Hughlings Jackson concept of release of function to account for decerebrate rigidity and the rigidity of hemiplegia. Thus he says: "Hughlings Jackson with characteristic penetration of thought argued nearly thirty years ago that rigidity ensuing in hemiplegia (hemiplegic contracture) is not owing to the cerebral lesion nor to the lateral sclerosis." Jackson concluded rather that the extensor rigidity stems from unantagonized activity of subcortical centres, possibly from the cerebellum.

Sherrington's analysis of decerebrate rigidity itself, which followed the pattern of his celebrated paper on the subject published in 1898, is characteristic of his approach to a scientific problem. He began with a lucid description of the attitude assumed by the decerebrate monkey: "The hand of a monkey is turned with its palmar face somewhat inward. The hind limbs are similarly straightened and thrust backward; the hip is extended, the knee very stiffly extended, and the ankle somewhat extended. The tail in spite of its own weight, and it is quite heavy in some species of monkey, is kept either straight and horizontal or often stiffly curved upward." He then added that when limbs or tail, head or jaw, are pushed from the pose they have assumed, considerable resistance is felt, and "on being released, they spring back at once to their former position and remain there for a time more rigid than before." He found that deep anaesthesia abolishes the rigidity, but section of the dorsal columns of the spinal cord fails to abolish it; section of one ventro-lateral column of the cervical spinal cord, on the other hand, destroys the rigidity in the fore and hind limbs of the same side. It was also destroyed in a given extremity by posterior root section. This classical analysis of the decerebrate state stands as the corner-stone of modern neurophysiological teaching.

The Stretch Reflex

After accepting the chair at Oxford, Sherrington devoted his attention to a more minute analysis of individual reflexes. With Frederick Miller he described the swallowing reflexes of the decerebrate cat, pointing out that one of the most effective stimuli of the swallow was a few drops of 30% alcohol. Probably his most important discovery in this later period was that of the stretch reflex, made in 1924 with his colleague, E. G. T. Liddell, who has succeeded to his chair. It had never been entirely clear to Sir Charles why the antigravity muscles could continue in a state of persistent contraction for an indefinite period without some obvious source of stimulation. He had found that the labyrinth could be destroyed, the neck muscles denervated, and the antigravity action still continued. In a given extremity he could denervate the skin and every other muscle save for the one under study—e.g., quadriceps—and the rigidity still continued in that muscle so long as its nerves were intact. Hence the stimulus for maintaining rigidity must arise in the muscle itself, presumably through some of the sensory endings which he had studied so successfully in 1894. When the quadriceps was detached from its insertion in the patella and allowed to shorten, the sustained contraction of the decerebrate state disappeared; if now the tendon were pulled upon, a sustained reflex contraction ensued—a "stretch reflex" had developed. The stretch of the muscles imposed by the muscle's normal anatomical attachments thus proved a sufficient stimulus to cause sustained contraction. The analysis of the stretch reflex was typically Sherringtonian, and the paper describing it proved as significant as anything that had appeared from Sherrington's pen since *The Integrative Action*.

While preoccupied with the stretch reflex Sherrington turned once again to an early interest—namely, the nature of central inhibition—and in 1925 published his principal paper on the subject. Another interest, which began with his study of sensory-nerve endings in 1894, was the ultimate unit of reflex action. In the case of the stretch reflex it seemed probable that the muscle spindle was the afferent receptor, but the morphological character of the motor unit had received little attention. It was known that following degeneration of sensory-nerve fibres in a muscle nerve the remaining motor fibres were far fewer in number than the muscle fibres in the muscle itself. With J. C. Eccles in 1930 Sherrington discovered that the average motor unit—i.e., the ventral horn cell and the group of muscle fibres which its branching axone innervates—is capable of developing some 10 grammes of tension. Sherrington's pupil, Dean Clark, made nerve and muscle fibre counts of the de-afferented preparations that Eccles and Sherrington had used to determine the contraction values of the motor unit, finding that the ratio of nerve to muscle fibres was approximately 1 to 140—so that on an average a single anterior horn cell controls more than a hundred muscle fibres.

The Philosophical Aspect

The philosophical implications of Sherrington's studies on the nervous system have often been discussed by his contemporaries, but Sherrington himself remained almost stubbornly silent on the subject until his Rede Lecture, delivered at Cambridge in 1933. Here we find him discussing the brain as an organ of the mind. He has allowed himself similar liberty in the Foreword to the 1947 edition of *The Integrative Action*. In the Rede Lecture he sounds somewhat frustrated when he asks:

"But indeed, what right have we to conjoin mental experience with physiological? No scientific right; only the right of what Keats, with that superlative Shakespearian gift of his, dubbed 'busy common sense.' The right which practical life, naive and shrewd, often exercises. To many of us a mere juxtaposition of the two sets of happenings proclaims their disparity. On the one side changing electrical potentials with thermal and chemical action making a physiological entity held together by energy relations; on the other, a suite of mental experience, an activity no doubt, but in what if any relation to energy? As for me, what little I know of the how of the one, does not, speaking personally, even begin to help me toward the how of the other. The two, for all I can do, seem to remain disparate and disconnected."

In 1947 one detects a similar note:

"In all those types of organism in which the physical and the psychical coexist, each of the two achieves its aim only by reason of a *contact utile* between them. And this liaison can rank as the final and supreme integration completing its individual. But the problem of *how* that liaison is effected remains unsolved; it remains where Aristotle left it more than 2,000 years ago. 'There is, however, one peculiar inconsistency which we may note as marking this and many other psychological theories. They place the soul in the body and attach it to the body without trying in addition to determine the reason why, or the condition of the body under which such attachment is produced. This, however, would seem to be a real

question.' Instead of, as is usual in physiology, leaving that impasse unmentioned, it seemed better to draw attention to it by the experimental observations in this book's final chapter."

Conclusion

And so we deem it a rare privilege to hail the man whose intellectual integrity has never allowed him to accept as truth anything that he has not proved to his own satisfaction. To the most profound student of the nervous system the world has yet known, the mind of man remains still unexplained. There are some, however, who may take issue with Sherrington when he modestly insists that the problem remains where Aristotle left it more than two thousand years ago; for many feel that Sherrington himself has pointed the road that will one day lead us to that goal. Some lines from *Ulysses* seem not irrelevant:

Come, my friends,
'Tis not too late to seek a newer world.
Push off, and sitting well in order smite
The sounding furrows; for my purpose holds
To sail beyond the sunset, and the baths
Of all the western stars, until I die.
It may be that the gulfs will wash us down;
It may be we shall touch the Happy Isles,
And see the great Achilles, whom we knew.
Tho' much is taken, much abides; and tho'
We are not now that strength which in old days
Moved earth and heaven, that which we are, we are—
One equal temper of heroic hearts,
Made weak by time and fate, but strong in will
To strive, to seek, to find, and not to yield.

For a complete bibliography of Sherrington's writings see appendix to the new edition of *The Integrative Action of the Nervous System* (Cambridge University Press, 1947). A full bibliography is also to be found in Denny-Brown's *Selected Writings of Sir Charles Sherrington* (London, Hamish Hamilton, 1940).

SHERRINGTON—THE MAN

BY

T. GRAHAM BROWN, M.D., F.R.S.

Professor of Physiology, University of Wales

"Such old enchantment as a boy's
when life first whispers use of life
entranced me . . ."

The words are from Sherrington's own verses on Iffley Church, and they confess a spell which in his case has been so strong and lasting that it is almost impossible to believe that we are called on to celebrate the ninetieth birthday of a heart so young. The occasion indeed calls for celebration, but it is difficult for a friend to pay adequate tribute to so essentially living a man, and the task is made the harder by Sherrington's own unself-conscious modesty, which springs from his intense interest in the outside world but nevertheless makes him vulnerable to shafts of honest praise. But he belongs to the world, and not to himself.

Sherrington was born on November 27, 1857. After leaving his school at Ipswich he began his medical studies at Edinburgh, where he was happy, but whence he was soon transferred to Cambridge to be there with his brother. On entering Caius College, his real Alma Mater, in 1880, he took his full part in its life—intellectual, social, and physical. Although slight of build he was fast on his feet and wiry, and in spite of his lightness he played as a forward in the college XV—a fact which says much for his athletic quality. His short sight, which forced him to use glasses, prevented him from taking much part in other games, but later in life he climbed in the Alps until about the time of his marriage, and it is easy to understand how he has retained an interest in, and a sympathy with, athletic games and sports

Early Influences

He was at this time greatly influenced by the men, such as Michael Foster and Gaskell, who were then playing their great parts in advancing the young British school of physiology and were bringing the spirit of experimental science into medical research and education as a whole. That spirit ultimately derived from the great experimenters of this country who had formed the Royal Society in the seventeenth century; but so far as medical science was concerned, the experimental method had flourished more vigorously in Germany during the period just before the Franco-Prussian War of 1870-1, when it had been brought back from Germany to its original home. In Sherrington's undergraduate days the leaven had so far chiefly affected physiology: anatomy remained a purely topographical study; pathology, not yet established as a chair at Cambridge, was largely a matter of the post-mortem room and the museum.

We may picture the young Sherrington as at first captured by the experimental spirit rather than by physiology as a special field for its adventure; but the picture will also show an unusually keen, inquiring, and zestful undergraduate who not only took a catholic interest in many subjects, but was also urged by his curiosity to learn what he could about the objects of his manifold interests. Above all, he projected himself, as it were, on the external world, and to that are due his absence of self-consciousness and, closely related thereto, the modesty, too unstudied to be shy, which is sometimes almost an embarrassment to his friends.

Towards the end of his time at Cambridge he was Demonstrator in Anatomy, and then, having taken Part II of the Natural Sciences Tripos with first-class honours, he went on to London in 1884 for his clinical studies at St. Thomas's Hospital. In that year also he held the George Henry Lewes studentship for physiological research at Cambridge, and his first scientific paper, a largely histological examination of the nervous system of one of Goltz's decorticized dogs, was written in collaboration with J. N. Langley. During the winter of 1884-5 Sherrington worked for a time in Goltz's Physiological Institute at Strasbourg, where C. S. Roy had held the post of assistant a few years before.

Experience Gained Abroad

In 1885 Sherrington obtained his membership of the Royal College of Surgeons, and in the same year he was sent by the Royal Society with C. S. Roy and J. J. Graham Brown to investigate the outbreak of Asiatic cholera in Spain, where these lifelong friends spent the summer and autumn. Of the three, Sherrington proved to be the best linguist, and to him fell the difficult and aggravating negotiations with the various officials who, properly, prevented access to the cordoned-off villages, but who could be induced with equal propriety, and by the traditional local method, to let the investigators pass. His mastery of the language led Sherrington to take an interest in Spanish literature, and particularly in the Spanish dramatists; and to it he also owed his friendship with Ramón y Cajal, who stayed with him in London some years later. The obituary notice of Cajal which Sherrington wrote for the Royal Society in 1935 is a tribute not only to that friendship but also to his own capacity for deep feeling. Not least among Sherrington's merits is his genius for solid and disinterested friendship.

After these pathological studies, and during the winter of 1885-6, Sherrington returned for a time to physiology at Cambridge, where Roy, who had been the first George Henry Lewes student in Sherrington's undergraduate days (1881), was now the newly appointed first Professor of Pathology. Later in 1886 Sherrington went to Italy to

investigate another outbreak of Asiatic cholera, and he thereafter spent more than twelve months in Germany, examining his pathological material in Virchow's laboratory and then more profitably with Koch, but also working in Berlin at experimental physiology with Zuntz and at histology with Waldeyer. On returning home in 1887 he became Lecturer in Physiology at St. Thomas's Hospital, his first independent post. In later years he worked again with Goltz in Strasbourg, and for a short time with Pflüger in Bonn, and elsewhere.

This foreign experience was a strong factor in Sherrington's subsequent development and in his general attitude to academic study. The great German masters of these days had been bred in the traditions of the idealistic, almost pastoral, Germany which existed before the beginnings of industrialization and materialism that followed closely on the Franco-Prussian War and on the creation of the German Empire of the Hohenzollerns. In that older Germany, which persisted in the strongholds of the universities, the ideal of academic liberty and the belief in the obligations as well as in the dignity of the academic life were felt to require open expression and assertion if they, and what they stood for, were to be maintained intact and handed on from master to pupil.

In that atmosphere loyalty was given above all to the objects for which an Institution was the instrument rather than to the Institution as such, and nowhere was this spirit stronger than in Strasbourg. Sherrington had been captured by the missionary spirit of his teachers at Cambridge. At Strasbourg, his first foreign experience, he again met it. When the Prussian Government refounded that university soon after the annexation of Alsace as a spoil of the Franco-Prussian War, the new chairs were offered to the best men in Germany, who regarded it as a point of honour not to refuse the call. The missionary spirit which moved that brilliant group of men was further strengthened by the local atmosphere which prevented social contacts between Germans and Alsatians and, even up to the time of the first world war, made it impossible for the two to drink their midday coffee at the same restaurant on the Kleberplatz. The isolated Germans could not have failed to feel, as in fact they did feel, that they held their chairs *in partibus infidelium*, and, as a necessary effect, their strong academic idealism seemed to call more than ever for conscious expression, almost fanatical.

The beginnings of the anti-vivisection crusade had already caused something of the same sort to happen at home, and to the impact of these missionary atmospheres may perhaps be ascribed Sherrington's strong views about academic liberty and intellectual honesty, his clear vision of the objective beyond its instrument, his belief in the fearless but judicial expression of opinion, his hatred of academic or political expediencies, and his distrust of what he calls "institutionalism"—the concentration of personal loyalty on the corporation rather than on the end for which it is devised. His rare anger is roused by sins against his own high ideal, and by little else except unworthy conduct, or meanness, or (as a passing flash) the culpable ineptitude of some unfortunate assistant. He taught one that in all things only the best is good enough, but he could sympathize even with our shortcomings.

His Contributions to Knowledge

Sherrington became professor-superintendent of the Brown Institution in 1891, and his marriage in 1892 began a continuously happy partnership with the lady to whose kindness we all owed so much. During the four years of his work at the Brown Institution before he succeeded Gotch as Professor of Physiology at Liverpool in 1895, Sherrington's scientific interest definitely turned to the subject which became his life's work. Before 1891 the greater number of his contributions to knowledge had been concerned with the structure of the nervous system; thereafter, the localization of function, as in the spinal roots, attracted him; and his interest in the clinically significant knee-jerk led him finally to the study of reflex function itself, as is described elsewhere by the able pen of Professor Fulton. Here again he gave his loyalty to the end rather than to the instrument—to function rather than to structure—and the parallel is revealing.

As a lecturer Sherrington had defects due to his own scrupulous search for exactness and clarity. He would pause, seeking the only word or phrase which would convey his precise meaning, and his dislike of dogmatic assertion caused him to insert qualifications and corrections as if in brackets. This would lead to hesitations and complexities, and it gave the impression that his own thought was being created and moulded as he went along. The ordinary student, fresh from the unequivocal teaching of the anatomy class, disliked the mental effort of learning which Sherrington's lectures demanded; but to those who wished to learn the effort was itself educative, and both the matter and the manner were fascinating. Similarly, his published work at first appealed to a limited circle, although within that circle the appeal was strong; and this was perhaps to be expected where a new terminology had to be invented in what was to all intents and purposes a new field, where the subject itself was of great complexity, and where the results might strike the unthinking as purely "academic"—that is, as of little practical significance. Even the importance of Sherrington's *Integrative Action of the Nervous System*, which was published in 1906 and is now recognized to be a landmark in physiology, was realized somewhat slowly by the generality.

His Varied Interests

It was to those who worked in his laboratory that Sherrington gave most and showed most. The research student would enter it, timidly, with a mental picture of the author of *Integrative Action* as a man who must dwell in a sphere of his own making, difficult to attain or to travel in—a man necessarily aloof and out of common reach, "academic," coldly intellectual. But the disarming spirit of equality with which the recruit was received at once destroyed a mental barrier which could not in any case have for long withstood the sympathetic friendship which was offered by Sherrington and earned lasting friendship in return. There was no pomp, no vestige of that Olympian arrogance which was so evident in some of the larger German institutes of the time. The laboratory life was a continuing adventure with always widening horizons. Chance talk would reveal what (but only at first) seemed to be Sherrington's surprising interests outside his own sphere—the Roman Wall, the Dutch masters of painting, Gothic architecture, old books and out-of-the-way bypaths of literature, the history of mechanical inventions, poetry (with strong preferences—Keats for one, and Tennyson, when the latter was still under a cloud in Bloomsbury), the Darwinian theory of evolution, the aesthetic movement of the 1880's, Canada, and all things youthful and adventurous. These in their turn would disclose unsuspected capacities for feeling and depths of feeling, as did Sherrington's own occasional verses. It was indeed possible, without self-consciousness, to show one's own verses to Sherrington—a thing which speaks for itself. In his emotions, too, Sherrington was catholic, and he would be moved not only by the beauty in a picture, or in an act, or in a mountain scene, but also by the beauty of an experiment or of an ingenious technical method. And always there was originality and insight. What would

delight the pupil was less the width of Sherrington's interests than the depth of his knowledge in each; and by the time the pupil had replaced his first crude picture with that of a many-sided, a lovable, and a very human man he himself had received a liberal education.

In such matters Sherrington for long kept himself to his intimate circle of friends except for the rare event of such verses as those in which he wrote of Canada in 1911, and the later poems to which he was moved by the first world war. It is true that he published some of these in *The Assaying of Brabantius* in 1925, but it was not until after he had retired from the chair of physiology at Oxford in 1935 that he really began to give the ordinary cultured reader what he had given to his happy laboratory or at his own fireside. Three articles in the *Cornhill Magazine* of 1936 and 1937 may be instanced here, as also his penetrating essay on *Goethe* (1942) and some remarkable reviews such as that in *Nature* (1937) on Ramón y Cajal's *Recollections*. But amongst all the works of these recent years there stand out his two memorable books—*Man on His Nature* (the Gifford Lectures given at Edinburgh in 1937-8 and published in 1940) and *The Endeavour of Jean Fernel*, which appeared only last year. When we reflect that these multiform activities are the work of a man in his ninth decade and sadly hindered by arthritis, we can only marvel at the persisting strength of the enchantment cast by Sherrington's youthful spell. And now, because it is the privilege of the recipient to ask for more, we may send our greetings and our thanks to Sherrington with fervent hope that he will long be preserved to add to the debt which we already owe him, and to continue what he himself expressed in *Brabantius*:

> "Impulsion stirred me, resolute
> with heart a-search and hastened foot,
> to work men service. . . ."

SHERRINGTON AS PHILOSOPHER

BY

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It should be the task of the philosopher to review critically the thought of his day, taking the various specialist modes of approach in a wider setting than is needed for a purely specialist treatment and trying to attain to a more comprehensive or synoptic view. There is an aspect of this task which is often forgotten and seldom rated as highly as it deserves. That is the interpretation of the thought of the past so as to make it intelligible to the present. In scientific subjects it is easy to get a distorted perspective unless we understand how recent thought has grown out of the earlier stages through the efforts of the pioneers, who nearly always mingled acute insight with confusion.

Because this work of interpretation is generally underrated I mention first Sir Charles Sherrington's exposition of the ideas of Jean Fernel in *Man on His Nature* and in his more recent book *The Endeavour of Jean Fernel*. In the fifteenth century, though Vesalius and Copernicus were at work, no branch of science except mathematics had yet reached a firm basis. Medicine was still weighed down by misunderstood tradition, bogus information, and downright superstition, astrology specially. Though scientific medicine belonged to the future, Fernel was struggling towards the light in a most interesting and suggestive way. To interpret that struggle requires sympathetic insight, a firm grasp of principle, and much hard work to see what lies behind confused and archaic terminology and to reconstruct forgotten ideas. The book on Fernel is a masterpiece, and —that very rare combination—a book that is a pleasure to read and also a work of scholarship in the strictest and most academic sense. In his lecture *Goethe on Nature and Science* Sir Charles shows the same skill in interpretation. Of course the reason for his skill is not far to seek. The author is both a poet and a man of science.

His Gifford Lectures

However, the philosophy of Sir Charles will always be judged by *Man on His Nature*, in which he took the opportunity afforded by the Gifford Lectures to survey the relations of the material, the living, and the conscious as displayed in the functioning living organism in general, and more especially in the functions of the nervous system. He also considered the place of mind or conscious life in the universe as a whole. The modern sciences of physics and chemistry, he argued, have expanded and sharpened our conceptions of material things so that the old simple-minded view that life is a kind of fire, which passed muster in the days of Fernel, is now dropped except as a metaphor, apt in one respect but misleading in all others. If greater knowledge of the material world has sharpened certain distinctions and abolished old fallacies it has not solved the main problem of the relation of the material and the mental; indeed, it has raised new problems. The physics and chemistry of the living body are peculiar and complex, but still physics and chemistry.

In the purely material realm things and processes, though in some respects continuous, are in other respects "granular," wrapped in bundles all separate and all similar—the quantum of action, the electron, the atom, the molecule. In the organic realm there are also "granular" entities on a larger scale that are fundamental—the gene, the nervous impulse, the cell. There is in addition a process of co-ordination or integration at work, operating through purely physical and chemical means, yet exemplifying an order over and beyond the physical order. In spite of this integration, the most elaborately integrated of all organisms, the human, though possessing a master organ, the brain, possesses no master cell. Instead, the highest centres of the brain appear to be a kind of republic of millions of cells. Where does the mind come in? Mind is certainly not granular in the way that atoms and nervous impulses are. It is not a special kind of matter or of energy, as earlier speculators often suggested.

The bodily organism which contains millions of cells can do a number of things simultaneously by means of reflexes and acquired habits, but the mind attends to one thing at a time. It goes so far as to see one visual field through the medium of two distinct organs. Moreover, for a great deal of psychology knowledge of brain function is irrelevant. This is seen equally in the modern work of the psycho-analytic school and the many excellent psychological observations of Aristotle, who associated the heart, not the brain, with conscious life.

Association of Mental Process and Bodily Functioning

In all this discussion Sir Charles brings out clearly the close association of mental process and bodily functioning and at the same time the difficulty, if not the impossibility, of completely identifying the mental with any kind of structure or activity of the body. Aristotle in his own way seems to have felt the same difficulty. He conceived of a hierarchy of bodily activities, the higher developing out of, dependent on, and yet fulfilling the lower. Sometimes he seems to identify the highest bodily activity with mental activity and sometimes to consider mind as distinct and perhaps even separable, following Plato to that extent. Sir Charles's conclusion is that man is really part of the

natural world from which he has developed, yet his mind is in some way distinct and able to judge that world as though from outside by means of its own conception of value. The world so judged is often found wanting.

A striking part of the discussion is the account of the life history of the malaria parasite and its implications for human life. From the point of view that I may perhaps be allowed to call plasmodio-centric, the story reveals a triumph of adaptation to environment. From the anthropocentric view the triumph is a terrible curse, one of the great disasters. Malaria has destroyed whole civilizations and still brings death and misery to millions. We cannot avoid believing that in this matter the anthropocentric view has a cosmic significance which the plasmodio-centric lacks. We deny that *Plasmodium* has as good a claim to be heard as *Homo*. However, if human moral judgment leads us to condemn some of the happenings of the natural world and approve of others, that is to be taken as a challenge to action, to maintain what is right and alter what is wrong. So far, but no farther, Sir Charles goes beyond his original starting-point of purely natural knowledge, because an honest acceptance of fact compels him to do so. He takes throughout his own line and works things out his own way, but he supports the testimony of a number of thinkers of our time who have deliberately started out from a naturalistic standpoint and found themselves forced to go beyond it by sheer pressure of facts. Alexander, Whitehead, and Laird may be mentioned, and also Woodbridge, in America. Where these thinkers differ most is after they leave the naturalistic view, and there Sir Charles has not committed himself. We must be grateful for what he has given us, expressed with rare felicity. When distinguished men of science, as Gifford Lecturers or otherwise, expound their philosophies they seldom do it so well. Above all, few have the skill in pilotage needed to avoid equally the Scylla of superficiality and the Charybdis of obscurity.

The Synoptic View

In conclusion, perhaps I may turn to Sir Charles's more strictly physiological work, particularly *The Integrative Action of the Nervous System*. Before that book was published there were plenty of facts available but a singular lack of the right concepts to interpret them. Sir Charles of course marshalled the known facts, adding a good many he had discovered for himself, but above all he provided the concepts which have been used ever since. Pre-Sherringtonian physiology of the central nervous system reminds one of the Oriental tale of the four blind men who examined an elephant. One seized a leg and said the elephant was a kind of tree; another a tusk and proclaimed it a kind of spear; the third the trunk and found it like a snake; the last got hold of the tail and said it was just a rope. Every statement reports a fact, and up to a point does it correctly; but they do not hang together.

The nervous system does contain converging and diverging paths; but how are they interconnected? Its functional unit is the reflex; but how are reflexes interconnected? A reflex does work rather like a penny in the slot machine, but not altogether; what are the differences? Given the Sherringtonian conceptions, anatomical and physiological facts could be seen in a new light—seen all together in a synoptic view and each also better seen in detail. Some of the important points have been well summarized in the foreword added to the new edition of *The Integrative Action*. Any reflex even at the lowest end of the scale operates as part of a system and uses the motor organs of the animal as a whole, though not all at once. It is not a matter of one bundle of receptors, one bundle of paths, and then one bundle of muscles. At the same time, a reflex has a permanent and apparently innate anatomical basis, so that it is an error to confuse reflex action with acquired habit. These more adequate conceptions are not so very easy to grasp; it is much easier to slip into the penny-in-the-slot view and to forget the limitations of reflex action—indeed, it is frequently done.

I mention these points because here, within a definitely restricted scientific sphere, Sir Charles has done the kind of thing the philosopher is always trying to do in a less restricted sphere with rather partial success. In some branches of science it may be possible to do without the synoptic view and see each thing separately; the trees may be more important than the wood. That is hardly possible in physiology, certainly not in the physiology of the nervous system.

METABOLIC DISTURBANCES AFTER INJURY*

BY

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It is remarkable that the existence of a disturbed metabolic state after injury should have remained unrecognized until 1929, when Cuthbertson observed an increase in the urinary nitrogen output following fractures in experimental animals. Later work demonstrated that this phenomenon also appeared in well-nourished human subjects who had sustained injury. The pattern of the metabolic changes in human patients has been worked out in detail (Stevenson *et al.*, 1945). During the first week after injury the urinary nitrogen output rises to a peak and brings about a phase of negative nitrogen balance even on high-calorie and high-protein diets. The output declines until about two to three weeks after injury, when it equals the protein nitrogen input. This phase is called the "katabolic" phase. Following it the input and output remain about equal for a few days or a week, and then the nitrogen output tends to decline and a phase of positive nitrogen balance begins. This lasts for a variable period, but is usually complete in two to three months after injury. This latter is the "anabolic" phase during which part at least of the nitrogen loss of the "katabolic" phase is repaired. The work of various investigators has shown that at least three factors condition the magnitude of increased nitrogen output in the "katabolic" phase—immobilization in bed, the severity of the injury, and the nutritional state of the individual at the time of injury.

*An abridgment of the Bernhard Baron Lecture given at the Royal College of Surgeons of England on July 4, 1947.

Effect of Confinement to Bed

Keys (1944) observed four normal well-nourished subjects who were put to bed for three to four weeks and allowed out of bed only to evacuate the bowels. At the end of three weeks the nitrogen losses were 51.7, 38.5, 58.6, and 43.5 g.; the body weights, however, showed no appreciable change. In the subject who lost 43.5 g. of

nitrogen the weight fell by only 0.86 kg. at the end of three weeks. With one exception all the nitrogen losses in the third week in bed were in excess of those observed during the first week (Table I).

TABLE I.—*Nitrogen Loss from Confinement to Bed (Calculated from Keys's data)*

Period	Nitrogen Balance per Period			
	Case 1	Case 2	Case 3	Case 4
Control	0	0	0	0
1st week in bed	−18·4	−13·4	−12·0	−12·5
2nd " "	−9·3	+2·9*	−21·5	−19·5
3rd " "	−24·0	−28·0	−25·1	−11·5
Total in bed ..	−51·7	−38·5	−58·6	−43·5
Ten days after getting up ..	+8·6	+5·3	+14·2	+27·4

* Protein input raised from 54 to 200 g. protein for this week.

These findings are of great importance, for they show clearly that a protein intake of 54 g. a day is not sufficient to prevent nitrogen loss in a patient confined to bed on an adequate calorie input. On the other hand Keys noted that in two subjects confined to bed it was possible to bring about a state of positive nitrogen balance on an intake of 110 g. of protein a day. Positive nitrogen balance during the ten days immediately following the three weeks in bed was attained on a protein input of 84 g. a day (13.4 g. of nitrogen). The variations in the speed with which the lost nitrogen was restored were most remarkable, although the diets were identical.

Effect of Injuries of Differing Severity

The following studies indicate how the magnitude of the nitrogen loss varies with different types of injury (Table II).

TABLE II.—*Operations and Injuries (Age of patients, 21–34 years)*

Trauma	Negative Nitrogen Balance		Duration of "Katabolic" Phase (Days)
	G.	G. per Day (average)	
Appendicectomy	26	2·2	12
	29	2·4	12
	37	2·2	17
Burns (lower limbs) ..	201	5·2	39
Burns (hands and arms)	216	4·6	47
Fracture of humerus ..	98	3·4	29
Fracture of femur ..	124	3·0	41
Osteotomy	32	2·3	14

The duration of the "katabolic" phase is given. This is measured from the morning of the day of operation in the operation cases and from the morning of the day after injury in the accident cases. All these patients were given diets which contained 2,750 calories and 100 g. of protein (16 g. of nitrogen) daily. On such diets Keys's data would indicate that normal uninjured persons confined to bed would have been in positive nitrogen balance or at least in nitrogenous equilibrium. The losses recorded in these cases of injury or operation may therefore be ascribed to the effects of the injury sustained. The total nitrogen loss and the average daily loss would seem to bear a direct relation to the severity of the injury, being highest in the cases of burns and lowest in the operation cases. Similar results have been reported by Browne and his group.

Effect of Undernourishment Before Injury

Browne *et al.* (1945) drew attention to the apparent absence of a "katabolic" response after operation or injury in persons who at the time of injury were in a poor nutritional state. Howard and Mason (1946) showed that when such people were put to bed they did not go into negative nitrogen balance as Keys's subjects did, and, moreover, when subjected to operation a negative nitrogen balance either did not develop or if one appeared it was of small magnitude. The following case illustrates the absence of the "katabolic" response in a poorly nourished patient.

A man aged 65 was suffering from an annular carcinoma of the oesophagus. Owing to difficulty in swallowing, food had been restricted for about three months, and for three weeks before admission had been limited to fluids. He had lost about 20 kg. when admitted—normal weight, 64 kg. The late Mr. Tudor Edwards regarded the condition as operable and planned the removal of the section of the oesophagus containing the tumour and anastomosis of the oesophagus to the stomach within the thorax. The necessary freedom was secured by dislocating the major part of the stomach into the left pleural space. The operation was successful and the patient recovered.

Before operation it was estimated that the patient was in nitrogenous equilibrium on a diet containing 1,600 calories and protein equivalent to 5 g. of nitrogen a day. On the day of operation and for the next six days he received by vein solutions of protein hydrolysate and glucose sufficient to provide 1,600 calories and 8.6 g. of nitrogen. Over the seven days the nitrogen balance was:

Input nitrogen ..	60.2 g.	Urinary nitrogen ..	51.8 g.
		Faecal nitrogen (10% of input)	6.0 g.
			57.8 g.

There was thus an apparent but slight positive nitrogen balance equal to 0.34 g. of nitrogen a day. While such a small positive balance is of little significance, it is significant that he did not go into negative nitrogen balance.

Source of the Excess Urinary Nitrogen

Cuthbertson *et al.* (1939) showed that "katabolic" response was absent after injury in experimental animals which had been fed on a protein-free diet until their nitrogen excretion became constant. They suggested that the excessive output of nitrogen which follows injury arises from storage protein and not from essential tissue substances, as when the storage protein was depleted there was no increase in the output of nitrogen after injury. Body protein has been differentiated by Whipple into (*a*) "fixed" or indispensable cell protein without which cellular life ceases, (*b*) "dispensable" protein which can be yielded up by the cell as a source of energy during starvation, and (*c*) "labile" protein which can move out of or into the cell when the concentration of the plasma protein falls or rises. Presumably Cuthbertson's storage protein can be equated with the sum of "dispensable" and "labile" protein of Whipple.

This protein may be present in the cell cytoplasm either as something apart from the cell protoplasm or as only a part of the cytoplasmic mass. If the cytoplasmic mass were reduced in quantity the cell would yield up not only protein but a quantity of its intracellular fluid. On the other hand it is conceivable that the cytoplasm could yield up protein while conserving its intracellular fluid. Howard and Mason (1946) found in cases of injury that nitrogen loss was not accompanied by a proportionate loss of potassium and phosphorus from the body. Presumably protein was yielded by the cell cytoplasm, but the intracellular fluid, which contains potassium and phosphorus, was conserved. Keys (1946), however, found in patients who were confined to bed but were otherwise normal that there was some potassium loss during the period when a negative nitrogen balance existed. Presumably such persons did lose some intracellular fluid. He noted that the body-weight loss was less than that which might be expected on the basis of the nitrogen loss. Both groups of experiments thus tend to support the idea that the body cells can yield up some of their protein without a proportionate loss of intracellular fluid. The evidence is therefore in favour of some part of the cellular protoplasm being "storage" protein. This, however, must not be taken

to imply that such protein is an inert store. It is difficult to estimate how much protein can be yielded up without causing death of the cell. Lusk (1928) calculated that the average human subject weighing about 68 kg. had a total nitrogen content of 2,000 g. Howard (1943) and Stevenson *et al.* (1945) have reported nitrogen losses of between 250 and 300 g. after fractures and burns. If all this nitrogen came from "storage" protein at least 15% of the body protein is available for the "katabolic" response. It is possible that when this amount of nitrogen is lost some mechanism may come into play to prevent destruction of more protein.

Mechanism of the "Katabolic" Response

Present knowledge of the mechanisms involved in the "katabolic" response is extremely scanty. Some facts have been brought to light which may in the future be found to have some causal relationship to the increased nitrogen output after injury. It has been found in normal persons that a few days after injury the urine contains large quantities of a cortin-like material (corticosteroid). The amount may be from three to five times the normal amount. The peak output is reached by the end of the first week after injury and thereafter tends to decline, reaching the normal level at about the time when nitrogen equilibrium is established (Browne, 1942). There is thus some parallelism between the daily excretion of corticosteroid and that of nitrogen. This material when concentrated has the power of increasing the glycogen content of the liver. This effect is identical with that obtained after the injection of the cortin (corticosteroid) of the adrenal cortex. It is believed that this corticosteroid inhibits the synthesis of amino-acids into protein. Consequently these acids, if not utilized by the body, are deaminated by the liver and in part built into liver glycogen. Their nitrogenous fraction is transformed into urea and excreted. If it be assumed that the increased excretion of corticosteroid after injury represents an increased production of the substance and not a diminished utilization or an increased permeability of the kidney to them, it might be inferred that a causal relationship exists between increased corticosteroid production and increased nitrogen output. Such an inference is however not justified, for many reasons. Injections of pituitary corticotrophic hormone into normal persons induce an increased output of corticosteroid in the urine (Schenker and Stevenson, 1943), an effect which is not accompanied by a parallel rise in nitrogen output. Venning (1944) has reported a case of burns which had a high corticosteroid output until the 28th day after the accident. Nitrogen excretion commenced to decline on the 21st day in spite of an increased protein input which had been given from the 12th day. The nitrogen balance in fact became positive before the level of corticosteroid excretion began to fall. This must mean that the "katabolic" response was waning at least 10 days before the corticosteroid output decreased.

It has been pointed out that in debilitated subjects injury does not lead to an increased output of nitrogen in the urine. The urinary corticosteroid excretion in such cases either is not increased or is reduced below the normal level. This lack of adrenal response to injury suggests that the explanation of Cuthbertson *et al.* (1939) that the lack of response was due only to absence of "storage" protein is not adequate. If such persons were given a large protein input after injury it might be expected that they would katabolize this extra protein as would a normal person who had been injured. The fact that they do not, but instead conserve the increased protein input, suggests that the mechanism for the "katabolic" response is being inhibited. The following case shows how avidly the organism seizes on the extra protein in the input when injury is sustained in the debilitated state.

A child aged 14 received multiple injuries including fractures of both tibiae and fibulae and severe lacerations to one of the lower limbs. After 10 weeks in hospital the fractures had not united and epithelization of the lacerated area had slowed down considerably. Skin-grafting of this area failed. Observation for a week after the skin-grafting operation showed that the nitrogen input was 39.5 g. and the total nitrogen output 40.2 g. Calorie input averaged 1,520 calories a day. The calorie input was raised to 1,750 daily with a protein nitrogen content of 15 g. a day. Over this week the nitrogen balance was:

Nitrogen input ..	106.5 g.	Urinary nitrogen ..	38.5 g.
		Faecal nitrogen (10% input) ..	10.7 g.
			49.2 g.

Positive nitrogen balance = 57.3 g., or 8.2 g. a day.

At the end of the week there was a noticeable improvement in the clinical condition and an active epithelization of the lacerated area. The denuded area from which the skin-graft had been taken was healing rapidly. The diet was increased to 2,100 calories and 22 g. of nitrogen a day. At the end of this week the nitrogen balance was:

Nitrogen input ..	160.3 g.	Urinary nitrogen ..	49.2 g.
		Faecal nitrogen (10% input) ..	16.0 g.
			65.2 g.

Positive nitrogen balance = 95.1 g., or 13.6 g. a day.

After another week on the same diet the positive nitrogen balance was 81.1 g., or 11.6 g. a day. The total gain in nitrogen was 233.5 g. over a period of three weeks. It was then decided to skin-graft the lacerated area. During the following week, the first day of which was the day of operation, the nitrogen balance was:

Nitrogen input ..	132.7 g.	Urinary nitrogen ..	156.2 g.
		Faecal nitrogen (10% input) ..	13.3 g.
			169.5 g.

Negative nitrogen balance = 36.8 g., or 5.3 g. a day.

Thus after a period of three weeks in a state of positive nitrogen balance a second operation provoked the normal response ("katabolic") which was lacking after the first. The clinical condition during this "katabolic" phase remained good and the skin-graft "took." Healing was rapid, and four weeks after the increased diet had commenced the fractures had united firmly..

The "katabolic" response to injury is thus conditioned not only by the injury itself but by some other unknown mechanism which may or may not involve the adrenal cortex. The fact that a mere increase in the corticosteroid output in the urine in normal uninjured persons produced by pituitary corticotrophic hormones is not associated with increased urinary nitrogen output suggests that increased adrenal activity alone cannot explain the "katabolic" response (Browne, 1943). In the debilitated person who has been injured increase in the protein input is not accompanied by increased nitrogen and corticosteroid outputs, which is precisely the reverse of the reaction of the normal individual. Browne *et al.* (1945), however, have reported two cases in which there had been loss of weight but which responded to increased nitrogen inputs by a typical "katabolic" reaction. Both patients died. It would appear that in them the mechanism which inhibited the "katabolic" reaction in the debilitated state was absent. In one of these cases the corticosteroid excretion was estimated and found to be of the same order as that of previously healthy severely damaged individuals.

In the "anabolic" phase which follows after the "katabolic" reaction the urine contains normal quantities of

the urinary corticosteroids and also of the 17-ketosteroids. The latter substances are derived in part from the adrenal cortex. Kochakian (1946) has shown that a 17-ketosteroid, presumably of adrenal origin, which has the power of conserving nitrogen can be isolated from the urine. This power is possessed by 17-ketosteroids of gonadal origin but is less pronounced in them. The magnitude of the positive nitrogen balance during the "anabolic" phase is not paralleled by the magnitude of the 17-ketosteroid excretion. It is independent of both the corticosteroid and 17-ketosteroid excretion. Testosterone propionate has been used with some success in increasing the positive nitrogen balance, but it has obvious disadvantages. It cannot in any way inhibit the "katabolic" response after injury in normal persons, but can increase the positive nitrogen balance after injury in debilitated individuals. The factors, other than the level of protein input, which influence the magnitude of the positive nitrogen balance in the "anabolic" phase are thus unknown.

Cuthbertson (1943) considered that the increased nitrogen loss after injury might result from the breakdown of protein molecules in an attempt to supply some component amino-acid of the protein molecules which was necessary for the repair process. If such an amino-acid formed, say, 3% of the protein molecule the remaining 97% of the molecule might be metabolized, as it could not be resynthesized into protein in the absence of an essential part of the molecular structure. The nitrogenous portion (amino-N) of 97% of the protein molecule would be transformed into urea and excreted, leaving the carbon chains to be utilized for energy production or for storage as glycogen. Croft and Peters (1945) thought that in burns the organism might require extra methionine. They reasoned that if this were so then the addition of an adequate quantity of this amino-acid to the diet would satisfy the need and spare protein from being broken down to meet it. Their results suggested that methionine supplements reduced the nitrogen loss after burns. Unfortunately it has not been found possible to confirm their results in human patients subjected to injury or after burns. This, however, does not imply that Cuthbertson's original hypothesis is untenable. The amino-acid necessary for repair might be one of the other "essential" amino-acids in the protein molecule. Rose, Haines, and Johnson (1942, 1943) have shown that nitrogen equilibrium can be maintained in human subjects when all the input nitrogen is provided by ten "essential" amino-acids. If one of these amino-acids is removed from the daily input a negative nitrogen balance follows. Until it has been shown that supplements of these "essential" amino-acids do not reduce or abolish the negative nitrogen balance after injury or operation Cuthbertson's hypothesis remains as a possible explanation of the reason why a negative balance occurs. It does not, however, offer an explanation of how the body protein is broken down and the "essential" amino-acid rendered available.

The position at present is very unsatisfactory. A hypothesis which suggests that the negative nitrogen balance after injury is due to the demand for some component of the protein molecule, the remainder of the molecule being metabolized, is not proved. On the other hand a possible hormonal mechanism which on being brought into action inhibits protein synthesis and permits the de-amination of amino-acids to take place at an increased rate has not been proved to have a causal relationship to the "katabolic" response to injury. Thus both the "why" and "how" of the "katabolic" response are uncertain. The finding (Cuthbertson, Shaw, and Young, 1941) that injections of crude extracts of the anterior pituitary gland into animals with experimental fractures prevented the usual weight loss and excessive nitrogen output is difficult to explain. It might have been expected that such injections would lead to increased activity of the adrenal cortex and presumably to an increased output of corticosteroid, with consequent inhibition of protein synthesis. Precisely the reverse occurred.

The same group of workers made the significant observation that skin wounds in experimental animals did not heal as rapidly as normal when crude extracts of anterior pituitary gland were injected. Now that relatively pure corticotrophic hormone from the pituitary gland is available these experiments require to be repeated and some attempt made to assay the urinary output of corticosteroid and 17-ketosteroids.

Vitamin C and Injury

For some years past in most surgical clinics ascorbic acid (vitamin C) supplements of 200–500 mg. have been employed as a routine in the post-operative period and after injuries. Wolbach (1937) defined the function of the vitamin as being concerned with the production and maintenance of intercellular substances. Bourne (1944) showed that the tensile strength of healed wounds was increased when adequate quantities of the vitamin were provided in the diet. The demand for ascorbic acid is, however, much greater than might be expected were it to be used only at the site of injury. All the patients listed in Table II received daily supplements of 500 mg. of ascorbic acid from the day of operation or from the day after accidental injury for periods up to 25 days. During the first five days of administration no trace of ascorbic acid could be detected in the urine. In the second five-day period the operation cases were all excreting between 50 and 100 mg. of the vitamin on the 10th day. The vitamin was not excreted in the cases of accidental injury. During the third five-day period the ascorbic acid output of the operation cases had risen to between 176 and 234 mg. a day on the 15th day. No vitamin was detected in the cases of burns on this day. These cases were given supplements of 500 mg. for a further 10 days. On the 20th day the fracture cases were excreting more than 150 mg., but no ascorbic acid appeared in the cases of burns. These showed traces of the vitamin on the 23rd day, and on the 25th day excreted less than 100 mg.

Long (1947) has pointed out that when the adrenal cortex is thrown into activity by some physiological stress such as injuries or infections the ascorbic acid content of the cortin diminishes. In his article he has noted the work of Lowenstein and his colleagues, who have suggested that ascorbic acid is a necessary component of some of the active corticosteroids existing in the adrenal cortex. It is thus probable that some part of the increased demand for ascorbic acid after injury may come from the adrenal cortex. The relation of ascorbic acid to the "katabolic" response may be even closer than this statement implies. The vitamin in the presence of traces of copper is known to augment the activity of the enzyme arginase (Edlbacher and Leuthardt, 1933). As arginase is concerned with what appears to be the principal urea-producing mechanism in the liver (Krebs and Henseleit, 1932), the importance of this reinforcing action is apparent. Kochakian (1944) has found that after a period of undernourishment rats show a fall in the liver arginase of 52%. It is by no means certain that the local demand for the vitamins at the site of injury, the need for more ascorbic acid in the adrenal cortex, and an increased supply to the liver are sufficient to explain the large over-all requirements of the body for ascorbic acid after injury.

Calcium Metabolism after Injury

It has been pointed out above that mere confinement to bed can produce a negative nitrogen balance. Reifenstein (1942) also showed that under like conditions the urinary calcium output may be doubled and the faecal calcium increased by one-third. In fracture cases the increased urinary calcium excretion reaches much higher levels. It then becomes a potential danger, for if conditions within the urinary apparatus are favourable the calcium may be precipitated as calcium phosphate and give rise to renal calculi. Shorr (1942) has shown that calcium excretion in the urine is balanced accurately in normal persons by the excretion of citrate. If enough of the latter ion is not available precipitation of calcium phosphate may occur. Investigations by Shorr and others have led to three possible methods for preventing calcium phosphate precipitation. The first is to use substances which can act as precursors of urinary citrate. No fully adequate material, however, has yet been found. The second method is to increase the output of urinary citrate by the use of oestrin; but such a method is not always desirable on account of other effects. The third method is to reduce urinary phosphate excretion by increasing faecal phosphate excretion. This Shorr (1943) accomplished by giving aluminium hydroxide by mouth. That substance forms an insoluble precipitate of aluminium phosphate in the bowel and leads to increased passage of phosphate into the bowel lumen. The value of these methods has not yet been fully explored.

Summary

In well-nourished persons subjected to injury the urinary nitrogen output increases to reach a peak by the end of the first week after injury. This high output gradually declines until in less severe injuries it reaches the normal level by the end of two to three weeks. Thereafter the level of output may decline further, but by the end of two to three months it returns to normal. The high nitrogen output may be diminished but not abolished by high-protein diets during the first seven to ten days. Continuation of such diets, however, leads to a positive nitrogen balance during the latter half of the period of high urinary nitrogen output and during the subsequent period. In this way the depletion of body nitrogen is compensated. The magnitude of the nitrogen loss in the urine depends on the nutritional state of the individual and on the severity of the injury. Some of the loss is due to the effects of immobilization in bed, but this part is relatively small. Poorly nourished individuals show either no metabolic response or a diminished one after injury. There is evidence that the severity of the injury conditions the magnitude of the nitrogen loss in the urine. The source of the nitrogen lost in the urine during the period of high output is the body cells. These apparently can yield up protein without affecting their viability.

The mechanisms involved in these metabolic disturbances are unknown. It has been shown that the urine during the period of high nitrogen output contains large quantities of corticosteroid material presumably derived from the adrenal cortex. It is not certain how an increased output of such material is related to the increased urinary nitrogen output.

After injury the body requirement for ascorbic acid (vitamin C) is apparently greater. Some of the increased demand may be due to an increased utilization in the adrenal cortex and the liver and some to the needs of the tissues at the site of injury.

The increase in calcium output in the urine after injury is a potential danger, as insoluble calcium phosphate may be precipitated, leading to the formation of calculi. Various methods of treatment to avoid precipitation have been advocated, but these are still in the experimental stage.

I wish to thank the many surgeons who permitted observations to be made on their patients and the dietitians who co-operated in this work. My thanks are also due to Mrs. P. H. Herbert, Leverhulme Scholar, and to my technical staff—S. P. Steward, L. S. Drewell, and R. D. Chambers—for their assistance in the analytical work. Dr. J. S. L. Browne has permitted me to quote freely from the reports of his group which have been recorded in the minutes of the Conference on Bone and Wound Healing.

References

Bourne, G. H. (1944). *Lancet*, **1**, 688.
Browne, J. S. L. (1942). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **2**, 43.
—— (1943). Ibid., **5**, 19.
—— Hoffman, M. M., Schenker, V., Venning, E. H., and Weil, P. (1945). Ibid., **9**, 15.
Croft, P. B., and Peters, R. A. (1945). *Lancet*, **1**, 266.
Cuthbertson, D. P. (1929). *Biochem. J.*, **23**, 1328.
—— (1943). Conference on Wound Healing, Soc. for Exp. Biol.
—— McGirr, J. L., and Robertson, J. S. M. (1939). *Quart. J. exper. Physiol.*, **29**, 13.
—— Shaw, G. B., and Young, F. G. (1941). *J. Endocrinol.*, **2**, 468, 475.
Edlbacher, S., and Leuthardt, Fr. (1933). *Klin. Wschr.*, **12**, 1843.
Howard, J. E. (1943). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **5**, 33.
—— and Mason, R. E. (1946). Ibid., **13**, 143.
Keys, A. (1944). Ibid., **7**, 90.
Kochakian, C. D. (1944). Ibid., **8**, 56.
—— (1946). *Vitamins and Hormones*, **4**, 255.
Krebs, H. A., and Henseleit, K. (1932). *Klin. Wschr.*, **11**, 757, 1137.
Long, C. N. H. (1947). *Recent Advances in Hormone Research*, **1**, 99.
Lusk, G. (1928). *The Elements of the Science of Nutrition*, 4th ed. Saunders, Philadelphia, p. 101.
Reifenstein, E. C. (1942). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **1**, 37.
Rose, W. C., Haines, W. J., and Johnson, J. E. (1942). *J. biol. Chem.*, **146**, 683.
—— —— —— and Warner, D. T. (1943). Ibid., **148**, 457.
Schenker, V., and Stevenson, J. A. P. (1943). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **4**, 91.
Shorr, E. (1942). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **2**, 99, 106.
—— (1943). Ibid., **3**, 69.
Stevenson, J. A. P., Schenker, V., and Browne, J. S. L. (1945). *J. Canad. med. Serv.*, **2**, 345.
Venning, E. H. (1944). Conference on Bone and Wound Healing, Josiah Macy, Jr., Foundation, **7**, 117.
Wolbach, S. B. (1937). *Science*, **86**, 569.

SYNCHRONOUS COMBINED TOTAL GASTRECTOMY

BY

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Since the introduction of transthoracic total gastrectomy in 1938 there has been an appreciable improvement in the results of surgery in carcinoma of the stomach. The work, among others, of Churchill, Sweet, Garlock, and Phemister testifies to this admirably and has altered the whole outlook, but even now the figures leave a good deal to be desired. The five-year cure rate is depressingly low, though it is early to assess it, and the mortality rate far too high. Finney and Rienhoff (1929) quoted a 53.8% mortality in 67 cases, Waugh and Fahlund (1945) 44.2% in 77 cases, and Clagett (1945) 16.6% (five deaths in 30 operable cases of malignant disease of the stomach). These figures illustrate the progressive improvement in surgical treatment of an otherwise fatal disease, and a great many factors are responsible—earlier diagnosis, better pre-operative preparation, an increasing resectability rate, advances in anaesthesia, and the introduction of chemotherapy and antibiotics.

This communication is essentially a preliminary one, recording a new method of approach which we have found useful, and clearly some time must elapse before any instructive figures are available or there are results from which deductions can be drawn.

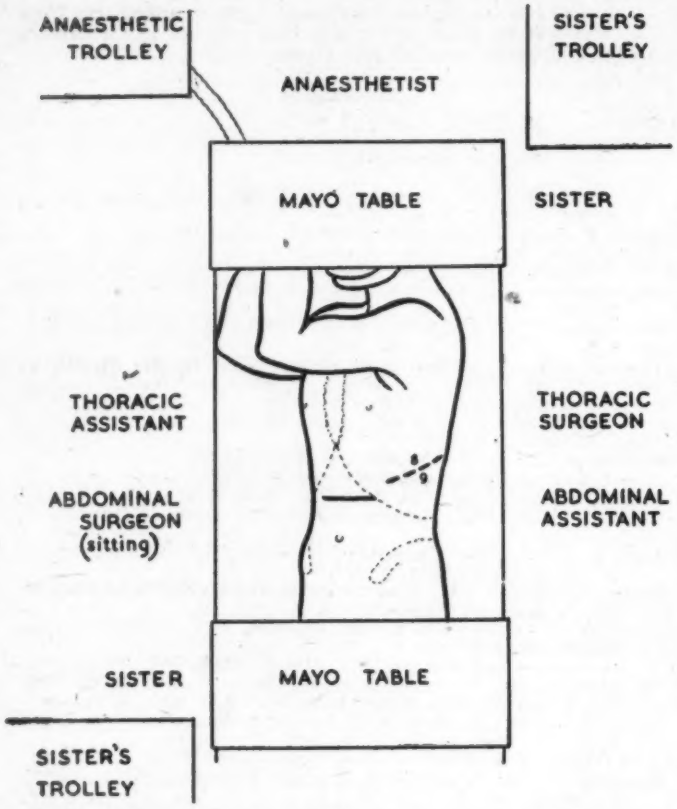

FIG. 1.—Diagram showing position of personnel and apparatus during operation.

In an attempt to reduce the time of operation we conceived the idea of two surgeons working synchronously, in a manner parallel to that employed in excision of the rectum (Morgan and Lloyd Davies). The position of the patient on the table has therefore been adjusted to make it possible for one surgeon to work in the chest at the same time as the other works in the abdomen (Fig. 1). A tilt of approximately 30 degrees (Fig. 2) has made this feasible, and it has been found easier for the abdominal surgeon to sit down and work through a transverse incision. This divides the left rectus muscle and just crosses the midline. Each surgeon has his assistant opposite him, though we have tried the alternative of having the assistant on the same side of the table. A Mayo table is placed at the head of the table and another at the foot, and an instrument trolley is provided for each of the two sisters; thus confusion or competition in the use of instruments is avoided. Finally, we pay particular attention to the position of the arms, avoiding the use of an arm rest, which was found to impede the thoracic surgeon. The illumination of the two wounds presents no difficulties provided that separate lights are employed. Additional spotlights can be used on either side if required.

The usual thoracotomy incision, with resection of one rib, has been made to approach the lower oesophagus, but we have not found it necessary to cut across the costal margin and join the thoracic and abdominal wounds. Experience of thoraco-abdominal wounds with and without damage to the costal margin has convinced us that its division is not only unnecessary for exposure but undesirable for the patient's convalescence. The thoraco-abdominal wound employed by surgeons such as Wookey and Tanner is therefore replaced by a thoracic and an abdominal wound separated by the width of the costal margin.

The lymphatic drainage of the stomach is so disposed (Fig. 3) that excision of the cardia and 2–3 cm. of oesophagus is essential if ablation of a growth is to be radical. Submucosal spread in the oesophagus and even enlarged lymph glands above the diaphragm occur often enough to commend this step. It is, moreover, an abnegation of surgical principles to remove only part of the lymphatic field in a disease so fatal as carcinoma of the stomach. We would go even further and say that the operation of partial gastrectomy for carcinoma of the stomach is lamentably conceived as a radical method of extirpation of malignant disease in this area. It should surely be replaced by total gastrectomy if and when this operation can be done with a comparable mortality.

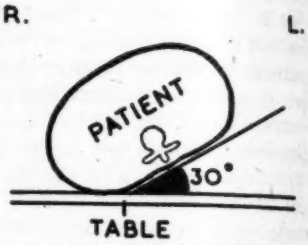

FIG. 2.—Tilt of the table.

Division of the jejunum and end-to-end or end-to-side oesophago-jejunostomy have been carried out, with an anastomosis of the Roux type to complete the operation, but these are details outside the scope of our present theme. Jejunostomy likewise seems to be a matter of individual preference, adaptable to certain patients but not invariably required.

The time of operation should, in our view, be two to two and a half hours in an uncomplicated case—the abdominal surgeon doing the division of the duodenum, lower stomach mobilization, and Roux anastomosis, and the thoracic operator the mobilization of oesophagus and cardia and the oesophago-jejunostomy. It is pertinent to add that the thoracic operator does not begin until operability in the abdomen has been decided by his colleague.

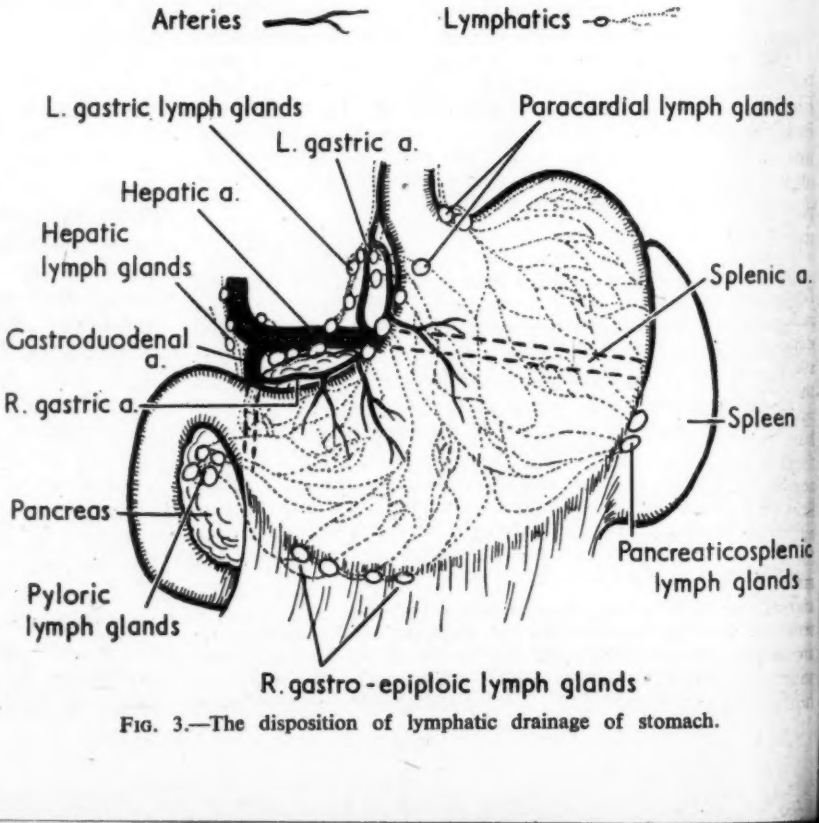

FIG. 3.—The disposition of lymphatic drainage of stomach.

We believe this to be easier than abdominal total gastrectomy as practised by Lahey and others. Decrease in the time of anaesthesia alone would seem to justify it, because patients with this disease tolerate anaesthesia badly. Our preference is for inhalational anaesthesia with endotracheal intubation, and if controlled respiration is employed the lung should be inflated at half-hourly intervals to minimize the risk of post-operative collapse. Bronchoscopy at the end of operation may in some instances be a wise additional measure.

Conclusions

The present position of surgery in relation to carcinoma of the stomach is unsatisfactory.

Immediate mortality from total gastrectomy for malignant disease is too high.

A reduction in the time of operation might help to reduce morbidity and mortality.

Synchronous combined excision through a thoracic and an abdominal wound is suggested as a means of attaining it.

We are indebted to Dr. John Hunter for his skill and care in anaesthetizing the patients, and to the staff of St. Andrew's Hospital, Dollis Hill, for much valuable help.

BIBLIOGRAPHY

Clagett, O. T. (1945). *Proc. Mayo Clin.*, **20**, 506.
Finney, J. M. T., and Rienhoff, W. E. (1929). *Arch. Surg.*, **18**, 140.
Garlock, J. H. (1942). *Surg. Gynec. Obstet.*, **74**, 555.
Pack, G. T., and McNeer, G. (1943). *Int. Abstr. Surg.*, **77**, 265.
Phemister, D. B. (1943). *Arch. Surg.*, **46**, 915.
Sweet, R. H. (1945). *Ann. Surg.*, **121**, 272.
—— and Churchill, E. D. (1942). Ibid., **115**, 897.
Waugh, J. M., and Fahlund, G. T. R. (1945). *S. Clin. N. Amer.*, **25**, 903.

EFFECT OF PENICILLIN ON BACTERIAL FLORA OF THE MOUTH

BY

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Many of the organisms present in the mouth as part of the normal flora or as pathogens have been known, since Fleming's original paper in 1929, to be penicillin-sensitive, but it was not until 1944 that the possibility of treating oral infections with penicillin was fully appreciated. Basing his observations on the bacteriological findings in a series of patients treated by Mowlem (1944) for infection of the mandible, Garrod wrote:

"The great majority of the very numerous bacterial species found in the mouth are penicillin-sensitive. This is of far-reaching practical importance, since it means that infections derived from or connected with the mouth are in general susceptible to penicillin treatment, just as those connected with the bowel are insusceptible owing to the prevalence there of resistant species. The flora of the mouth is highly complex and has been imperfectly studied; the following observations are therefore perforce of an elementary nature. In plates, both aerobic and anaerobic, inoculated with material from osteomyelitis of the jaw, from infected compound fractures of the jaw, and from infected gums, or with saliva, the only organisms ever found markedly resistant to penicillin as judged by the cup method have been *Monilia albicans*, an occasional *Neisseria*, and *Haemophilus*. Whole groups of bacteria which are thus sensitive in doubtless varying but apparently adequate degrees are aerobic streptococci (including various types of *Str. viridans*), anaerobic streptococci, anaerobic Gram-negative bacilli (*F. fusiformis* and many others unidentified), and various Gram-positive bacilli. The mixed and predominantly anaerobic flora often found in infections derived from the mouth is thus in general sensitive to penicillin, and the results of treatment are as would be expected from this."

These findings were confirmed by MacGregor and Long (1944, 1945a), who incorporated penicillin in a slowly dissolving pastille for use in the mouth; the patient was instructed to insert another when the previous one had disappeared. By this means the saliva could be kept fully bacteriostatic throughout the day. Promising results were obtained in a variety of infectious conditions of the oral cavity and in prophylaxis against infection secondary to surgical or dental trauma in the mouth.

Since then penicillin has been applied to the mouth by numerous workers, using many different techniques; the whole subject has recently been reviewed by Hutchinson and Cranston Low (1946). It is not proposed to discuss these various techniques, but to describe the bacteriological findings in a series of patients who were treated with penicillin during the years 1944–6. These patients were classified as follows:

A. *Patients Receiving Local Penicillin Treatment* (Penicillin Pastilles).—(1) Patients with acute gingivo-stomatitis (Vincent's type); (2) patients with acute and chronic tonsillitis; (3) patients under the care of the Maxillo-facial and Plastic Units at Hill End Hospital, St. Albans, while receiving treatment for a variety of traumatic, surgical, and dental conditions. The total number of cases was 500.

B. *Patients Receiving Systemic Penicillin Treatment.*—(1) In a dosage of 500,000 to 1,000,000 units of penicillin in 24 hours:—(*a*) Patients treated under the scheme sponsored by the Penicillin Trials Committee of the Medical Research Council for the investigation of the penicillin treatment of subacute bacterial endocarditis; (*b*) patients treated for severe diphtheria and scarlet fever; (*c*) patients treated for actinomycosis. The total number of cases in Group B 1 was 30. (2) In a dosage of less than 500,000 units of penicillin in 24 hours:—(*a*) As Group B 1 (*a*); (*b*) patients receiving routine penicillin treatment for a variety of conditions. The total number of cases in Group B 2 was 30.

Excretion of Penicillin in the Saliva

Changes can be produced in the bacterial flora of the mouth by the administration of penicillin either locally as already stated (Garrod, 1944; MacGregor and Long, 1944) or systemically if sufficiently large dosage is employed (Long, 1946a, 1946b, 1947). It is probable that in the latter case the changes are caused by penicillin excreted in the saliva, though attempts to demonstrate this have either been unsuccessful (Rammelkamp and Keefer, 1943) or have detected it only in small quantities (Florey *et al.*, 1941; Struble and Bellows, 1944; Fleming, 1945). No simple relationship has been shown to exist between the penicillin content of the saliva and the penicillin content of the blood. Herrell (1945), reviewing the evidence, is unable to be dogmatic, and states: "I am inclined to believe that fairly adequate amounts of penicillin do reach the saliva following systemic administration." The persistence of highly penicillin-sensitive organisms in the mouth of patients receiving less than 500,000 units of penicillin systemically in 24 hours, combined with failure to demonstrate penicillin in their saliva, suggests that the threshold for penicillin excretion in the saliva is attained only by a dosage of this magnitude. However large the dosage employed systemically, penicillin will be demonstrable in the saliva only in the initial phases of treatment, for as soon as the organisms of the *Bacterium* group establish themselves in the mouth penicillinase is produced in sufficient quantity to destroy it. Further work on the concentration of penicillin in the blood, the excretion of penicillin in the

saliva, and the changes produced in the flora of the mouth at a given time will possibly clarify the position.

Changes in Flora of the Mouth

Whether penicillin is administered locally, or systemically in the dosage stated, the changes produced in the bacterial flora in the mouth are the same, but with systemic administration the flora of the tonsils, pharynx, and nose is also affected. Moreover, the action can be maintained throughout the 24 hours, whereas with the local method of treatment continuous action depends on the conscious co-operation of the patient.

After the administration of penicillin by either route there was a rapid fall in the number of viable penicillin-sensitive organisms present in the mouth. The changes appeared first in the saliva, in which the total viable count fell from about 60,000,000 organisms per ml. to about 8,000,000 organisms per ml. in a few minutes (MacGregor and Long, 1945b). Changes in the bacterial flora of the gum pockets and superficial parts of the tonsils followed in a few hours, and were more striking when the systemic method of administration was employed. Since the nose is the main source of droplet spread of haemolytic streptococci (Hamburger and Green, 1946) the systemic action of penicillin in rendering patients non-infectious is very important. The suggestions that penicillin pastilles might replace the use of surgical masks (Fleming, 1945) and render carriers of haemolytic streptococci non-infectious (MacGregor and Long, 1944) are no longer tenable.

The use of systemic penicillin in large dosage in the treatment of nasopharyngeal diphtheria has been discussed elsewhere (Long, 1947). Initial experiments on carriers of haemolytic streptococci and diphtheria bacilli show that this kind of treatment is the most effective known. Cultures from excised tonsils indicated that the flora of the crypts remained unaltered by penicillin pastilles, but the effect of massive systemic dosage is not known, since none of the patients so treated had their tonsils removed. It is important to discover the effect of such therapy on the tonsillar crypt flora for other reasons also. For instance, such treatment may be of value in haemolytic streptococcal infections in patients suffering from rheumatic fever and other ailments associated with infected tonsillar crypts.

During the first few days of treatment *Haemophilus influenzae, Neisseria pharyngis sicca,* and *Monilia albicans* were the only organisms demonstrated in cultures made from material taken from the oral cavity. Such cultures often remained sterile.

This first phase of rapid reduction of organisms was followed by a second phase of bacterial invasion by organisms of the *Bacterium* group. Of 312 patients suffering from acute gingivo-stomatitis (Vincent's type) treated with penicillin pastilles in collaboration with Dr. A. B. MacGregor, 77% became infected by Gram-negative bacilli between the second and seventh days of treatment. Had all the patients been fully co-operative and sucked their pastilles regularly it is probable that the figure would have been higher. It was noted that conscientious patients often became infected with Gram-negative bacilli earlier than did the careless ones. All patients receiving systemic penicillin in a dosage of a million units a day for more than three days developed a secondary bacillary infection, most of them on the third to fourth day of treatment, whether penicillin was administered locally or systemically. Once present the invading organisms rapidly increased in numbers until the total viable count in the saliva was about 60,000,000 per ml. On stopping treatment they gradually decreased in numbers as the normal flora re-established itself. Gram-negative bacilli did not produce penicillin stomatitis, but were associated with a breakdown in intra-oral surgery with destruction of skin- and bone-grafts. Mowlem (1945) states that "penicillin pastilles may lead to the appearance of extraneous organisms which are not penicillin-sensitive and the presence of which is more disastrous than is that of the normal flora of the mouth." Protected by the penicillinase produced by these organisms, the flora of the mouth present before treatment partly returns. Thus in a patient with a very severe acute gingivo-stomatitis secondary to metal poisoning, who was never cured by penicillin pastilles, organisms of the *Bacterium* group always established themselves before the pathogenic organisms could be eliminated. Nowadays, with penicillin freely available, all penicillin-sensitive organisms could probably be eliminated from the lesions of such patients by massive systemic dosage before the organisms of the *Bacterium* group became established.

Three hundred strains of various species of Gram-negative bacilli isolated from the patients already mentioned were classified as follows:—

Bact. aerogenes, Type I	40%	*Intermediate*, Type II	4%
Bact. coli, Type I	17%	*Bact. aerogenes*, Type II	1%
Intermediate, Type I	14%	Irregular other types	16%
Bact. coli, Type II	4%	*Pseudomonas pyocyanea*	4%

As the majority were of non-faecal type it is probable that they were derived from food or water.

Behaviour of Certain Mouth Micro-organisms

Ordinary strains of *H. influenzae* are penicillin-resistant, but it is interesting to note that the haemolytic variety, which on a blood-agar plate may often be mistaken for a haemolytic streptococcus, is remarkably sensitive and is rapidly removed from the mouth by penicillin treatment.

The effect of penicillin on *Actinomyces bovis* is also peculiar. Marked changes in the morphology of this organism, with loss of its characteristic dimorphism and a tendency to assume the bacillary form, were associated with atypical colony formation which rendered identification difficult once treatment had been started.

Summary

Changes in the flora of the mouth were studied in 500 patients treated by the administration of penicillin locally in small dosage by pastilles, and in 60 patients treated systemically with penicillin given by intramuscular injection.

Penicillin-sensitive organisms were eliminated from the surface of the tonsils and from the nose and pharynx, as well as from the mouth, by systemic administration in large dosage (approximately one million units a day). Patients were thereby rendered non-infectious.

The changes in the flora of the mouth are divided into an initial phase of reduction of the penicillin-sensitive organisms of the mouth and a later phase of invasion by Gram-negative bacilli. The practical consequences of these changes are discussed.

Penicillin excretion in the saliva probably occurs only when a dosage of over 500,000 units in 24 hours is employed. It will be demonstrable only during the initial phase of reduction of bacteria, before the organisms of the *Bacterium* group have established themselves.

Three hundred strains of secondary invading organisms are classified.

It is a pleasure to acknowledge the helpful criticism of Prof. L. P. Garrod, in whose laboratory this work was undertaken. Many of the observations made are based on work carried out with Dr. A. B. MacGregor on the administration of penicillin in pastille form. I am indebted to the staff of St. Bartholomew's Hospital and to Mr. Rainsford Mowlem, director of the Maxillo-facial and

Plastic Units at Hill End Hospital, St. Albans, for their co-operation and for providing much of the clinical material.

REFERENCES

Fleming, A. (1929). *Brit. J. exp. Path.*, **10**, 226.
—— (1945). *J. roy. Inst. Publ. Hlth. Hyg.*, **8**, 95.
Florey, H. W., *et al.* (1941). *Lancet*, **2**, 177.
Garrod, L. P. (1944). *British Medical Journal*, **1**, 528.
Hamburger, M., and Green, M. J. (1946). *J. infect. Dis.*, **79**, 33.
Herrell, W. E. (1945). *Penicillin and other Antibiotic Agents*. Philadelphia.
Hutchinson, A. C. W., and Low, P. Cranston (1946). *Brit. dent. J.*, **81**, 211.
Long, D. A. (1946a). *British Medical Journal*, **1**, 627.
—— (1946b). Ibid., **1**, 773.
—— (1947). Ibid., **1**, 884.
MacGregor, A. B., and Long, D. A. (1944). Ibid., **2**, 686.
—— —— (1945a). *Brit. dent. J.*, **78**, 33.
—— —— (1945b). *Nature*, **155**, 201.
Mowlem, R. (1944). *British Medical Journal*, **1**, 517.
—— (1945). In A. Fleming, *Penicillin*, Butterworth, London.
Rammelkamp, C. H., and Keefer, C. S. (1943). *J. clin. Invest.*, **22**, 649.
Struble, G. C., and Bellows, J. G. (1944). *J. Amer. med. Ass.*, **125**, 686.

CALCULATION OF TUXFORD'S INDEX BY GRAPHICAL METHODS

BY

H. CAMPBELL, B.A., F.S.S.

(From the Nuffield Department of Industrial Health, University of Durham, King's College, Newcastle-upon-Tyne)

Q.—*In a large series of cases the calculation of Tuxford's index of nutrition in childhood is laborious and time-consuming. Is it possible to devise a graph from which the index may be rapidly computed?*

Tuxford's (1939) index of nutrition in male children is given by the formula:

$$T = \frac{W}{H} \times \frac{379-m}{0.3} \quad \text{(Equation 1)}$$

where W = weight in lb., H = height in inches, and m = age in months.

The normal level of the index, according to Tuxford's data, which were based on 584,000 measurements made in 1909–10, is 1,000. Although this is naturally an arbitrary figure it is contended that the index does provide some basis for a comparison between different groups of children and between different stages of development among the same children when a clinical examination is not possible. The validity of this assumption was tested extensively against clinical examination by Huws Jones (1938).

The calculation of the index for a large number of cases is laborious, and although a graphical method of calculation was indicated in the original paper it is not simple to use.

The original formula can be arranged as follows:

$$y = \frac{W}{H} \text{ (Equation 2)} \quad \text{and} \quad y = \frac{0.3T}{379-m} \text{ (Equation 3)}$$

It should be noted that "y" is an algebraic expression which is needed only for the construction of graphs and is not calculated in any individual case.

Construction and Use of the Graphs

Equations 2 and 3 can now be graphed separately. In the case of Equation 2, if y is the vertical axis and W the horizontal axis, then for one given fixed value of H there is a diagonal line which will fix all values for y and W. Consequently by drawing a series of diagonal lines, like contours, for each value of H from say 18 to 66 in. it is possible to cover all appropriate values of W, y, and H. The simplest way to construct this graph is to notice that along the horizontal line y = 1.0, W = H, so the exact points for W for each height can be fixed—e.g., H = 20 in., W = 20 lb. Similarly along the line y = 1.5, $W = \frac{3}{2}H$, so the exact points of W can again be fixed—e.g., H = 20 in., W = 30 lb. These points can then be joined by straight lines and extended if necessary. A skeleton of this is outlined in Graph 1.

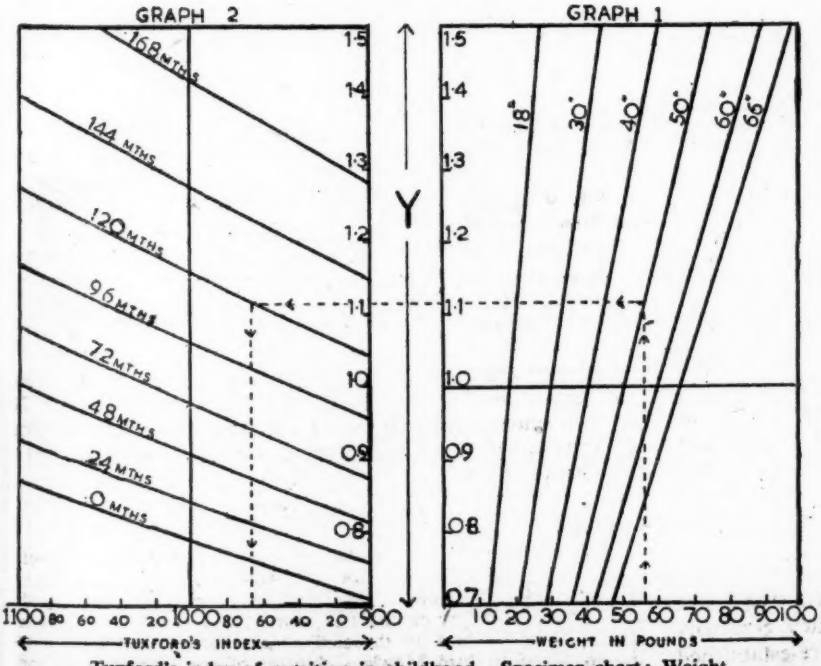
In the case of Equation 3, again make y the vertical axis on exactly the same scale as before, only this time tabulate it on the right-hand side of the graph. If T is the horizontal scale moving from right to left, then, as before, a series of contours for each fixed level of m can be drawn which will be straight lines. The simplest method of drawing these is to take the two vertical lines T = 1,000 and T = 900, where y will be $\frac{300}{379-m}$ and $\frac{270}{379-m}$ respectively. This gives two points for each value of m, and thus the corresponding contour line will be fixed uniquely—e.g., m = 0 and T = 1,000, then y = 0.792, and when m = 0 and T = 900, then y = 0.712. The line joining these two points gives the contour for age at birth. This is illustrated in Graph 2. Graphs 1 and 2 may now be placed side by side so that the vertical axes coincide.

If it is proposed to use a separate index for females as suggested by Tuxford it will be necessary to construct an alternative Graph 2 from the formula:

$$y = \frac{0.27T}{355-m} \quad \text{(Equation 4)}$$

As previously, all the contours are straight lines which can be readily constructed by marking the two points where each line cuts the two vertical lines T = 1,000 and T = 900.

Use of the Graphs.—On Graph 1 measure off the weight of the child along the horizontal axis and the height along a diagonal contour; these will give a fixed point. Place a ruler horizontally through this point, move along the ruler on to Graph 2 until it cuts the appropriate age contour on this second graph, then move vertically downwards on to the T scale; this will fix the index of nutrition. An alternative method would



Tuxford's index of nutrition in childhood. Specimen chart: Weight 56 lb., height 50 in., age 120 months; index 967.

be to engrave Graph 2 on a transparent substance such as mica or celluloid, which could then be moved over the first graph until the age contour coincides with the appropriate point on Graph 1.

Accuracy of the Result

The accuracy of the result depends entirely upon the size of the scales and the skill of the draughtsmanship used in their construction. The best scales on ordinary 1/10-in. squared paper would probably be:

for y from 0.7 y to 1.5 y=16 in.
for W from 0 to 100=10 in.
for T from 900 to 1,100=10 in.

The height contours can then be drawn for every inch in height from 18 to 66 in. and the age contours for every 3 months from 0 to 168 months. In these conditions it will be possible to determine T accurately to the nearest unit.

To demonstrate the use of the graphs an illustrative chart is given. Start with weight 56 lb., move vertically upwards till this line cuts the contour for height 50 in., then move horizontally to the left until the contour for age 120 months is cut on Graph 2, then vertically downwards on to the scale for the index, which reads T=967.

References

Jones, R. Huws (1938). *J. roy. stat. Soc.*, **101**, 1.
Tuxford, A. W. (1939). *J. Hyg.*, **39**, 203.

Medical Memoranda

Spontaneous Delivery of Placenta in Front of Foetus without Haemorrhage

Spontaneous delivery of a placenta in front of the foetus is a rare happening, and for it to occur without haemorrhage is very rare indeed.

Case Report

The patient, a 7-gravida aged 43, was admitted to hospital under the care of Prof. Hilda Lloyd on May 24, 1947, as an emergency case with a prolapsed cord. Her last menstrual period began on Sept. 12, 1946, she was thus 37 weeks pregnant. She had no abnormal symptoms during this pregnancy, and was reported as having been normal before the onset of labour. Her six previous pregnancies included four normal ones and two breech presentations, both of the latter resulting in stillbirths.

She stated that pains had started at 5.30 o'clock that evening, the "waters breaking" two hours later with the escape of a "moderate" amount of blood-stained liquor. She was quite definite that it was "blood-stained water" and not pure blood. She also stated that the cord first appeared at the vulva shortly after this, and she then (and only then) sent for her nurse, who promptly summoned the doctor.

On admission at 9.45 p.m. her general condition was good, temperature 98.2° F. (36.8° C.), pulse 100, and B.P. 134/88. The urine contained no albumin, sugar, or acetone. There was no clinical anaemia. Abdominal examination showed the foetus to be lying obliquely, with the head in the right iliac fossa. She was having good contractions, one every three minutes, but the presenting part was not fixed. The foetus was a small one. No foetal heart could be heard. Inspection of the vulva showed a protruding loop of umbilical cord, involving about 6 in. (15 cm.), lying outside the vulva.

The patient was anaesthetized with thiopentone and gas, oxygen, and ether, and placed in the lithotomy position. After thorough disinfection of the vulva and prolapsed loop of cord, which was not pulsating, a hand was inserted into the vagina, and the placenta was encountered lying free but without any membrane attached. It was now obvious that the foetus must be dead; the placenta was removed, and the cord excised generously to minimize the risk of carrying infection upwards during the subsequent manœuvres. The cervix was dilated between three and four fingerbreadths, soft, and thin. The presentation was a shoulder with the back anterior.

In view of the retention of membranes and the small dead foetus, immediate delivery was decided on. After internal version had been performed a leg was brought down, and gentle traction was exerted on the half-breech. The other leg was then brought down and the foetus delivered without difficulty as far as the waist. Both arms were extended and were now brought down. The body was then allowed to hang for two or three minutes by its own weight, after the manner of Burns. At the end of this time the cervix still gripped the head firmly, so the skull was perforated through the mastoid region, delivery then being completed without difficulty. There was no abnormal bleeding. Ergometrine, 0.5 mg., was given intravenously, and the retained membrane was removed with forceps. Again there was no unusual loss. The cervix and lower uterine segment were carefully examined, but were found to be undamaged. The patient was given 100,000 units of penicillin immediately, and a total of 500,000 during the next twenty-four hours, as a prophylactic, systemically. The puerperium was entirely afebrile, and was normal in every respect.

The foetus (with perforated skull) weighed 3 lb. (1.36 kg.), and was a male with a marked degree of hypospadias and double hare-lip. It revealed no sign of maceration. The placenta showed no gross abnormality, was normal in size, and weighed 11 oz. (310 g.)—a fair weight in proportion to the weight of the foetus.

Comment

It is suggested that the possible mechanism was that the placenta had a poor attachment, becoming detached with the onset of pains, and that the uterine contractions, possibly assisted by a mild degree of hydramnios (a not unreasonable assumption in view of the foetal abnormalities), drove the presenting part down and plugged the placental area. If this was partly or largely on the anterior surface of the lower segment the foetal back was ideally placed for the purpose.

The assumption that the placenta was attached to the lower segment seems to be the only possible explanation that covers the three facts of primary placental separation, retention of membranes completely, and absence of haemorrhage.

My thanks are due to Prof. Hilda Lloyd for permission to publish this case, and to Mr. Hugh McLaren, First Assistant to the University of Birmingham Gynaecological and Obstetric Unit, for his advice and encouragement.

M. Halden Lloyd, M.B., Ch.B.,
Late House-Surgeon, Birmingham Maternity Hospital.

Suturing the Fractured Olecranon

For those who prefer simple suture to the use of wire or screw for the fractured olecranon the following method may be found useful in overcoming the difficulty of tying sutures tightly enough to give perfect fixation.

The fragments are drilled transversely. Two sutures are passed through the drill holes in opposite directions and tied as tightly as possible. The knots then lie one on each side of

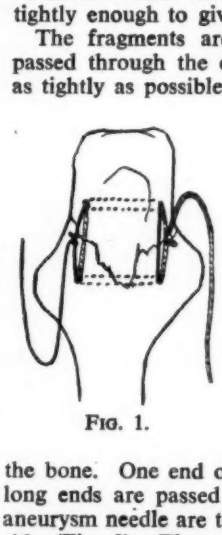


Fig. 1.

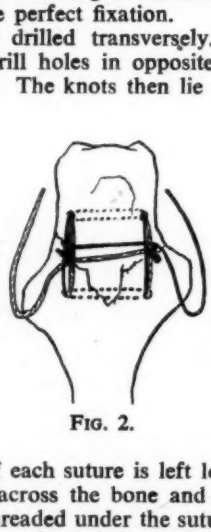


Fig. 2.

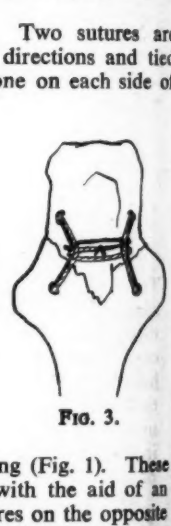


Fig. 3.

the bone. One end of each suture is left long (Fig. 1). These long ends are passed across the bone and with the aid of an aneurysm needle are threaded under the sutures on the opposite side (Fig. 2). They are then tied together tightly across the bone, thus greatly increasing the tension of the sutures, and incidentally holding down the spur of bone commonly found on the upper fragment due to the oblique direction of the fracture (Fig. 3).

The principle is of course in common use at sea and for lashing loads on railway trucks and lorries.

T. J. Fairbank, F.R.C.S.

Reviews

A FOUNDATION OF NEUROLOGY

The Integrative Action of the Nervous System. By Sir Charles Sherrington, O.M. Second edition, entirely reset. With a new foreword by the author. (Pp. 433. 25s.) Cambridge: The University Press. 1947.

It was indeed an inspiration that moved the Physiological Society to have a new edition of Sherrington's *Integrative Action of the Nervous System* issued on the occasion of the recent International Physiological Congress at Oxford. In doing so they have honoured not only the author but also the British school of physiology, which owes so much to him, and they have recreated the stimulus this imperishable work gave to physiologists forty years ago. I have called it "an imperishable work," for it is one of those works, rare in science, the permanent value of which is unquestionable, and I believe that future generations of physiologists will so acclaim it. In physiology it holds a position similar to that of Newton's *Principia* in physics, and when physiologists finally emerge from that preoccupation with technologies under which the present generation staggers, and when they find time and the inclination to contemplate and interpret the innumerable observations now being accumulated in such unresting haste, the full stature of this book and the permanent quality of its author's teaching will become apparent. For it is more than an orderly record of precise observations: it is a product of sustained thought upon what is essentially—though only his genius revealed it as such—a single problem—namely, the mode of nervous action. Sherrington advances the argument step by step, exposing the full significance of each new aspect of the problem as he brings it to light. Here is no medley of *ad hoc* hypotheses but a logical analysis and synthesis bearing the imprint of scientific genius.

A detailed account of the *Integrative Action* is not necessary here or possible in a brief notice, but the principles of reflex action that he expounded will remain essential foundations of whatever edifice of knowledge may yet be erected upon them. The book is a primer for every physiologist and student of clinical neurology—indeed, for every medical man who values the study of precise observation and its integration into ordered knowledge as part of a scientific training.

To-day the thoughts and affection of all his pupils and admirers go out to Sir Charles Sherrington, and they recall with gratitude the inspiration he has been to them and the generous and ready help he was always so willing to afford them. They will welcome the new edition of this book and will see in it a good omen for the future of physiology.

F. M. R. WALSHE.

ANOTHER HEREDITARY DISEASE

Heredopathia Atactica Polyneuritiformis. A Familial Syndrome not Hitherto Described. By Sigvald Refsum. (Pp. 303; 28 figures. No price given.) Oslo: Johan Grundt Tanum Forlag.

The author of this monograph gives a detailed history of five cases of "a familial syndrome not hitherto described" seen in three sibships of two unrelated families. The condition is of considerable interest, and it is always something of an event to hear of yet another hereditary disease. A recessive gene seems to be the cause of the disease in all cases. As is to be expected in so rare a manifestation, the malady has occurred in each case in the offspring of consanguineous parents who showed no sign of a similar affection.

The ages of the patients at the date of observation were 41, 32, 23, 38, and 32 years. Signs of disease had appeared some years before, but in no case had serious incapacity previously occurred. The main characteristic signs include (*a*) night-blindness, with loss of the peripheral fields of vision and fundal changes—not, however, typical of retinitis pigmentosa; (*b*) difficulty in walking, noted at the ages of 36, 28, 20, 37, and 32 respectively; (*c*) "polyneuritis-like manifestations" associated with muscular wasting, ataxia, and sensory disturbances. The author discusses the relationship of the cases to retinitis pigmentosa, Charcot–Marie–Tooth's disease, and hereditary ataxia, to none of which conditions in its typical form does the condition appear to approximate. As an addendum to the monograph he describes necropsies on two of the patients who died suddenly. Distinct pigmentation of the nerve cells in all sections of the brain, and marked disturbances in the lipoid and probably in the protein metabolism, were found. The pathologist, Dr. Cammermeyer, concluded that the disease belongs to the lipoidoses and is closely related to Niemann–Pick's disease and to familial amaurotic idiocy.

Though this volume presents facts of great interest, it might with advantage have been shortened by the omission of a good deal of discussion, much of it shown by the post-mortem findings to be irrelevant.

JULIA BELL.

RECENT NEUROLOGY

The 1946 Year Book of Neurology, Psychiatry and Neurosurgery. Neurology: edited by Hans H. Reese, M.D., and Mabel G. Masten, M.D. Psychiatry: edited by Nolan D. C. Lewis, M.D. Neurosurgery: edited by Percival Bailey, M.D. (Pp. 732; illustrated. $3.75 or 21s.) Chicago: The Year Book Publishers, Inc. London: H. K. Lewis and Co. 1947.

The series of *Year Books* is a welcome annual addition to one's professional library. Since 1945 some of the subjects have been redistributed, and neurology now accompanies psychiatry and neurosurgery, while endocrinology is consigned with metabolism and nutrition to another volume. This little book is an interesting and useful guide to the current literature—perhaps we should say to current American literature, for there is a tendency to emphasize unduly the work of local writers. Indeed the editors of the neurological section confess in their introduction that "the clinical material from foreign countries has been abstracted only with regard to its obvious importance, since too much of it reviews old material." Rather than take umbrage at any fancied neglect, we in Britain might act on the hint, produce a greater output of original work, and look to the present rather than the past.

The *Year Book* series compares, of course, with its older cousin, the *Medical Annual*. There are differences in the scheme of presentation. In the British work contributors more often take as their unit a subject rather than an author's individual communication and make *en courant* comments and criticisms, while the American *Year Book* consists of abstracts of original articles, with editorial remarks appended in small print. Both methods have their advantages, but the *Year Book* may well be said to appeal less to the medical practitioner than to the embryo specialist.

MACDONALD CRITCHLEY.

WHY AND HOW

Man: The Verdict of Science. Science and Superstition. By G. N. Ridley. The Thinker's Library, No. 114. (Pp. 156. 2s. 6d.) London: Watts and Co. 1946.

This book is a succinct and clearly written account of anthropology, if we use that term with its widest connotation. Mr. Ridley does not try to disguise his own opinions but honestly seeks to epitomize fairly the opinions of others. The publisher's "blurb" is truthful in saying that "the result is a book which will be found stimulating reading, even by those whose philosophy impels them to disagree with Mr. Ridley's conclusions." Even theologians, with whom Mr. Ridley is not in charity, are not likely to be irritated, for his "philosophy" is very naive. For instance, we read on p. 10 (a typical passage):

> "A long time ago marriage between members of a family was observed to produce frequently abnormal offspring, and these were regarded as a sign of God's displeasure at the practice. It therefore became illegal in the eyes of the Church and the State for near relatives to mate. When, many centuries later, science had devised methods by which to study how children inherited their characteristics from their parents, the whole matter was put on an entirely new foundation—a foundation of fact that effectively removed it from association with the irrational beliefs that people had formerly entertained concerning God's feelings on the subject."

As Karl Pearson (by no means a lover of theology) used to say, Science is concerned not with the question Why? but with the question How? Those who believe in a divine order may be mistaken in their answer to the question why

things are as they are. To show *how* inbreeding may produce bad results does not, and indeed ought not, to shake their belief. The father of vital statistics, John Graunt, noted that although more males than females were born more died before puberty, and so, as he said, "Every woman may have an husband, without the allowance of polygamy." Contemporary theologians were delighted by this demonstration of how God, who in their opinion disapproved of polygamy, had made it unnecessary. Mr. Ridley is, like Laplace in the anecdote, quite entitled to say that *he* has no need of the hypothesis of God, but he should not misrepresent it.

Mr. Ridley's section on psychology is useful, but a paragraph on Aristotle's psychology would have improved it. Not only did the Aristotelian definition of the soul as the realization, the entelechy, of the body have an immense influence on subsequent thought, but his discussion brings out the essential difficulty of any hypothesis which in a scientific sense *describes*, not *explains*, the soul–body relation. The name of Berkeley does not appear in the "Reading Guide" or in the text, which is a pity. The three dialogues between Hylas and Philonous are not likely to convince materialists that "matter" is impossible, but it is always wise to hear what can be said against one's beliefs when it is said in such good English. T. H. Huxley did not agree with Berkeley, but he admired him.

M. GREENWOOD.

A GREAT REFORMER

No Centenario de Pestalozzi. Monografia No. 4 do Boletim do Instituto de António Aurélio da Costa Ferreira. (Pp. 61. No price given.) Lisbon.

This monograph was dedicated by the António Aurélio da Costa Ferreira Institute in Lisbon to the memory of Johann Heinrich Pestalozzi, the Swiss educational reformer, on the second centenary of his birth. In it Prof. D. Santos discusses this great humanitarian's message for a generation confronted with nearly 32 million child victims of war. He gives a brief account of Pestalozzi's poverty-stricken childhood, the influences—especially that of Rousseau—that moulded his character and inspired his life's work, and its full flowering in 1798 when he came to the relief of children orphaned through the French invasion of Switzerland. Santos discusses his subsequent educational experiments and his numerous publications. Pestalozzi strove to attain an educational system that would permit a psychological approach to the individual, directing his harmonious development and spiritual regeneration, and he aimed also at making human labour an ennobling influence. Santos calls for a revival of his ideals in an age when technical studies and the memorizing of facts dominate education. He calls for schools which will be "a nursery of men and not factories of automata." Child psychologists, magistrates of juvenile courts, and social workers will endorse his views.

The monograph also contains appreciations of Pestalozzi by two graduates of the University of Lisbon. One illustrates from Pestalozzi's writings the role of the mother in education and of the woman in society, and analyses his educational system; the second describes his personality and work. Of topical interest is the article by W. R. Corti (reprinted from *Pro Juventute*) which completes the monograph. He describes the village of Pestalozzi—the child settlement which is being established at Trogen, in Switzerland. Inspired by Pestalozzi's example in 1798, it offers shelter and family life to the disinherited orphans of the war and aims at preserving their national qualities in an international medium. Corti outlines the magnitude of the problem and urges the need for this example to be followed in all countries.

J. J. KEEVIL.

The Care of Babies and Young Children in the Tropics is an admirable pamphlet written by Dr. John Gibbens and obtainable from the National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality, 5, Tavistock Place, London, W.C.1 (price 1s.). Dr. Gibbens gives a simple account of elementary measures to be taken against infectious diseases in the Tropics, detailed instructions for feeding the baby on breast milk or artificially, and includes advice on inoculation, suitable clothing, and care of the skin.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

Adrenalinfree Cyclic Anesthesia. By Béla Mezö, M.D. (Pp. 40. No price.) Budapest: Printing House Frater. 1946.

The author describes his method of inducing analgesia by infiltrating the sympathetic ganglia with adrenaline-free "pantocaine."

A Synopsis of Hygiene (Jameson and Parkinson). By G. S. Parkinson, C.B.E., D.S.O., M.R.C.S., L.R.C.P., D.P.H., and K. M. Shaw, M.B.E. 9th ed. (Pp. 791. 28s.) London: J. and A. Churchill. 1947.

A textbook of public health and hygiene, with an account of the relevant laws.

Essentials for Final Examinations in Medicine. By John de Swiet, M.D., M.R.C.P. 3rd. ed. (Pp. 178. 9s.) London: J. and A. Churchill. 1947.

Intended to aid rapid revision before taking the "finals."

Practical Points in Penicillin Treatment. By G. E. Beaumont, D.M., F.R.C.P., and K. N. V. Palmer, M.B., M.R.C.P. 2nd ed. (Pp. 18. 1s. 6d.) London: J. and A. Churchill. 1947.

Notes on the organisms sensitive and insensitive to penicillin, the diseases for which it is suitable, and methods of administration.

Disfunciones Motoras del Estómago. By E. Arias Vallejo (Pp. 155. No price.) Madrid. 1947.

A monograph on functional disorders of the stomach and intestines.

Renewal Pages for Nelson Loose-Leaf Surgery. New York and London: Thomas Nelson and Sons. 1947.

Curare: Its History, Nature, and Clinical Use. By A. R. McIntyre, Ph.D., M.D. (Pp. 240. 27s. 6d.) Chicago: The University of Chicago Press. London: Cambridge University Press. 1947.

The author discusses botanical details, the chemistry of curare, its physiological effects, and its clinical uses.

Obstetrics and Gynaecology. By C. Scott Russell, M.A., M.B., F.R.C.S.Ed., M.R.C.O.G. (Pp. 214. 12s. 6d.) London: Geoffrey Cumberlege, Oxford University Press. 1947.

A short revision book intended particularly for returning ex-Service men.

O'Meara's Medical Guide for India and the Tropics. By H. W. Williamson, O.B.E., M.D., M.R.C.P., F.R.C.S.Ed. 5th ed. (Pp. 928. 30s., postage 1s. extra.) London: Butterworth and Co. 1947.

An alphabetically arranged guide to medical practice.

Les Varices. By I. Florian. (Pp. 137. 6 Swiss francs.) Bucharest. Les Editions d'Etat. 1947.

A monograph on varicose veins, including an account of their treatment.

Differentialdiagnose der Lungenröntgenbilder. By Rudolf Zeerleder. 2nd ed. (Pp. 296. 28 Swiss francs.) Berne: Hans Huber. 1947.

The use of skiagrams in the diagnosis of lung conditions; profusely illustrated.

The Personality of the Preschool Child. By Werner Wolff, Ph.D. (Pp. 341. 25s.) London: William Heinemann. 1947.

An account of the mentality of children aged from 3 to 5.

Arthur de Bretagne. By Claude Bernard. 2nd ed. (Pp. 156. No price.) Paris: J.-B. Baillière and Sons. 1947.

A drama by the famous French physiologist, written in his youth.

Le Ferite Osteo-Articolari d'Arma da Fuoco. By Stefano Morando. (Pp. 172. 900 lire.) Turin: Edizioni Minerva Medica S.A. 1947.

An account of gun-shot wounds of bones and joints and their treatment.

Bassini's Operation Modified. By Major V. P. Gupta, M.S. (Lucknow), F.R.C.S. (Pp. 36. No price.) Bombay: The Popular Book Depot. 1947.

An account of the author's modification of Bassini's operation for inguinal hernia.

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THE INFLUENCE OF SHERRINGTON ON CLINICAL NEUROLOGY

Sir Charles Sherrington, O.M., will be 90 years of age on Nov. 27. To celebrate this notable event and to honour a great man we publish in the opening pages of this issue three articles on his life and work. It was in 1904 that Sherrington gave his Silliman Lectures, published subsequently in 1906 under the title of *The Integrative Action of the Nervous System*, at Yale University; so it is fitting that the appraisal of his profound contributions to neurophysiology is made in our opening pages by the present Professor of Physiology at Yale, Dr. John F. Fulton. As Dr. Fulton observes, *The Integrative Action of the Nervous System*, like Harvey's *De Motu Cordis*, marked a turning-point in the history of physiological thought, and in this the author's ninetieth year the Physiological Society prompted the issue of a new edition, brought out by the Cambridge University Press in time for the XVIIth International Congress of Physiology at Oxford in July of this year, the Yale University Press having generously transferred their ownership of copyright to the Physiological Society. The value of the new edition is enhanced by a 12-page foreword in which Sherrington once more illustrates his high qualities as humanist and philosopher. The decorticated animal, "a Cartesian puppet," is a mindless animal that "reacts with the fatality of a multiple penny-in-the-slot machine to certain stimuli, all of them, as in the case of the penny-in-the-slot machine, physical, and not psychical." Integration, Sherrington observes, has been traced at work in two great systems of the organism. The physico-chemical produced a unified machine. "The psychical creates from psychical data a percipient, thinking, and endeavouring mental individual." And he ends his 1947 foreword thus: "That our being should consist of *two* fundamental elements offers I suppose no greater inherent improbability than that it should rest on one only."

Sherrington the philosopher is considered elsewhere in this issue by Prof. A. D. Ritchie. Here we may inquire more particularly into the impact of his work upon the development of clinical neurology, an impact perhaps seen most clearly in the writings of Dr. F. M. R. Walshe, whose Victor Horsley lecture of 1946 appears abridged in the middle pages of this *Journal*. Perhaps the simplest way in which to assess the influence of Sherrington's work upon clinical neurology would be to turn to the volumes of *Brain*, or to those of any other representative neurological journal abroad, during the first decade of the present century, and then to pass on to the volumes of the same journals in the second and subsequent decades. The contrast in outlook revealed by the later volumes is as striking now as it was while the change was unfolding before those who from about 1910 onwards were taking their first steps in clinical neurology. They had the great good fortune to begin their work under the inspiration of *The Integrative Action*, because, viewed in the light of the sequence of precise observation and of the principles so clearly evolved from them by Sherrington, the numerous reflex and motor disorders seen in affections of the nervous system in man began to gain a meaning and an orientation that they before had lacked. Disorders of movement and certain reflex reactions of limbs in cases of nervous disease were seen in the light of Sherrington's synoptic exposition. The old familiar signs one after another began to assume a physiological meaning, and thus progressively revealed the fundamental plan of the organization of movement and of posture in man, a plan which linked him with the humbler vertebrates, the monkey, the dog, the cat, in regard to their motor taxis.

It was not that clinical observation became more detailed or accurate, for indeed nothing could have exceeded in minute precision and descriptive clarity the accounts of disorders of movement and of reflex reaction in hemiplegia and paraplegia so abundantly given by the French school of neurology in the early years of this century. The pages of the *Revue Neurologique* of that time bear witness to the clinical acumen and scrupulously accurate observation that characterized the clinical neurology of the day, and even of still earlier days. Reading modern neurological literature, indeed, one may sometimes feel that our standards in this regard would be the better, perhaps, did we refresh ourselves from time to time by the study of these earlier models. What had changed after 1910–15 was not clinical skill or power of accurate description; it was the point of view. Once again, as before in Jackson's day, clinical neurology had received a fresh inspiration from physiology, and had been ready to accept it.

For too long, perhaps, the "physical sign" had been sought and cherished for its practical usefulness in locating the lesion and in pathological diagnosis. The point of view was empirical, and the link between clinical and physiological thought frail and not always evident. The literature of the early nineteen hundreds abounded in an ever-increasing number of eponymous signs, which, while they provided convenient symbols for the ends of description and of empirical classification, were regarded primarily as diagnostic weapons. When neurologists sought to relate them to normal modes of function the line of approach was loosely phylogenetic—for example, the writhing movements of the athetotic child were likened to the antics of our hypothetical arboreal ancestors. On such a soil false analogies grew readily, but in general the physical sign was a phenomenon pragmatically regarded and esteemed. It is but fair to say, however, that in this country the conscious intent to interpret signs in terms of disordered function had never ceased since Jackson's day, and the publication of *The Integrative Action* did not so much change the direction of neurological thought as give the physiological outlook a tremendous impact on the British school of clinical neurology, a stimulus which later spread in widening circles to every centre of neurological study

in the world. That this stimulus worked sooner and more powerfully here was perhaps our good fortune rather than our virtue, for we were nearer to the source of inspiration and had not—like neurologists abroad—to wait for translations, or to grapple as foreigners with Sherrington's occasionally formidable English, at times reminiscent of Doughty's in *Arabia Deserta*.

From 1914 onwards the pages of *Brain* have shown a series of important papers analysing clinically observed phenomena in terms of Sherrington's observations and interpreting them in terms of physiological principles as these were expounded in his writings. Such papers steadily increased in number until it could be said that the Sherringtonian influence had pervaded neurological thought. A fresh accession, deriving at one remove from the physiology of decerebrate rigidity and of muscle tone, came from the work of Magnus and his school, a true and direct offshoot from Sherrington's work. And what is true of the succeeding volumes of *Brain* is true of all neurological journals, and to-day it would be difficult to overestimate this influence or to find any field of neurological advance in which it is not somewhere evident. The gain to neurological thought and knowledge has been inestimable: they have become progressively less empirical. Scientific method and thought have enriched and given order to the abundance of facts of observation, detailed and precise, which are the treasury of clinical neurology. Clinical observation has come itself to enrich and supplement the body of experimentally derived neurophysiological knowledge. After all, the nervous system of man is the finest of its kind, the most complex and the most highly endowed with capacities for further development, and much of the study of that system, in health and in sickness, can come only from clinical observation. Thus the relation of experimental neurophysiologist with clinical neurologist has been one of a natural partnership, of give and take, and for this admirable consummation we owe more to the influence of Sherrington's thought and work than to any other source or combination of sources.

This has been Sherrington's gift to clinical medicine, a field of knowledge and a discipline which have always attracted his deep and sympathetic interest; an interest which has embraced not only the work but also, and with so generous a mind, the individual worker. This kindest and most modest of great men "belongs," as Professor Graham Brown so well says, "to the world, and not to himself," and so, we hope, will accept the small tribute made to him in this week's *Journal*.

THE CRIMINAL JUSTICE BILL

Reform in the law of criminal justice is long overdue. It is required not so much to raise the practice of the courts as to bring the law itself up to the level of existing practice. The new Criminal Justice Bill has been anticipated in recent years by the anxious consideration which the courts have shown in awarding punishment, particularly to the young offender. They have done their best to keep him out of prison, and have called in probation officers, doctors, Army authorities, and others in the search for a less dismal alternative. The Bill is an effort to enable the letter of administration to catch up with its spirit. A similar Bill was introduced by Lord Templewood, then Sir Samuel Hoare, when he was Home Secretary in 1938. It was given a second reading without a division but had to be dropped on the outbreak of war. The new Bill repeats the principal proposals made at that time. It seeks to make the punishment fit not the crime but the criminal.

The power of courts to impose sentences of corporal punishment is to disappear. The Departmental Committee[1] which considered this subject in 1937 declared that corporal punishment as a court penalty should be entirely withdrawn. More recently the Joint Committee of the British Medical Association and the Magistrates' Association made a recommendation to the same effect. The Bill is silent on the question of capital punishment, but this will be a matter for free debate. "Penal servitude" with its ticket-of-leave system and "hard labour" with its suggestion of crank and treadmill are to be abolished. A more debatable change is the abolition of statutory prison divisions. It might have been better to leave the classification of prisoners to be decided by the court rather than by the prison governor. The Bill gives more facilities to courts which desire a medical report. It has been difficult for a court of summary jurisdiction to obtain a report unless the offender was remanded to prison; now it will be possible to remand him on bail on condition that he submits himself to medical examination. It is not stipulated that the examiner must be a psychiatrist or that, if he has to do with a juvenile, he must have a knowledge of child psychology; the phrase used is "a duly qualified medical practitioner"; but apparently a particular practitioner may be specified by the court. If an offender is certifiable as insane a court of summary jurisdiction will be given the same power to make a reception order as a magistrate has already in the case of a person of unsound mind not charged with any offence.

It is in the amendment and consolidation of the law relating to probation that the Bill is most admirable. The system of probation has now stood the test of sixty years' experience. The character of the delinquent has been guided, his social background improved, employment found for him, and any mental deviation discovered. Power is now to be given to the court when it appears from medical evidence that the offender may be susceptible to treatment for his mental condition to require him to submit to such treatment for a period not exceeding twelve months. It might have been better to make the case subject to review at the end of twelve months, and to extend the period if thought desirable. The form of treatment is apparently left to the judgment of the practitioner; it may be residential or non-residential. Borstal is retained in the Bill, though the upper age limit is reduced from 23 to 21. Possibly Borstal, which has not quite come up to expectations, may give place ultimately to something like the new detention centres to which courts will be able to send under-age offenders. Even the word "prison" may one day follow "workhouse" and "asylum" into oblivion. There is something in a name, and here a change of name indicates a new outlook. Incidentally, the term "criminal lunatic," which escaped the fate of other obsolete terms when the

[1] Cmd. Paper 5684. 2s. 6d. net; also *British Medical Journal*, 1938, 1, 680.

Mental Treatment Act, 1930, came in, will disappear under this Bill. Henceforth there will be no more "criminal lunatic asylums"; they will be "Broadmoor institutions" under the Board of Control, and the former "criminal lunatic" will be a "Broadmoor patient."

It is worth while trying to place in perspective the class of cases with which the courts have to deal, the predominant age groups of the offenders, and the principal crimes with which they are charged. Those whose business it is to attend assizes or quarter sessions are aware that a large proportion of the prisoners—at the present time, for understandable reasons, a very large proportion—are young men between the ages of 18 and 25. The calendar for the current session at the Central Criminal Court may be said to represent major crime in the county of London for one month, and to give a fairly typical picture of the country as a whole. It excludes, of course, juvenile court cases and cases dealt with summarily. Of the 177 prisoners 65 had not reached their twenty-sixth year, and just upon 100 were under 30. In about half these cases the offences charged were stealing in one form or another. There were also 13 cases of forgery, which is another form of stealing, and a rather smaller number in which the charge was that of obtaining money by false pretences or by fraudulent conversion. Only in 9 cases was the theft accompanied by threats or violence. In 14 other cases the offence was that of "causing grievous bodily harm"; in two it was manslaughter, and in one attempted murder. Sex offences were comparatively rare. Among these hundred young men, one was charged with indecent assault, one with a homosexual offence with an older man, and two with rape. Older prisoners, those over 30, include a few, the despair of judges and recorders, who have more or less a lifetime of convictions behind them, but also others who at a mature age are guilty of a first and sometimes apparently inexplicable lapse. But it is the younger men—and these, too, often come up with a long list of convictions—who are mainly responsible for the lengthening of the calendars, the prolongation of sessions to two or three times their normal duration, and the talk of increased post-war crime. Most of them were at school, or on the point of leaving school, when war was declared, and they have passed their later adolescence in a violent and unseemly world. Very few of them are in any respect mentally deficient; mostly they have a sharp intelligence. A committee of the B.M.A. declared[2] fifteen years ago that the term "mental defective" could not be applied to the great majority of such persons. Nor are they psychological cases in any special sense.

In a certain number of delinquents psychiatric advice—and in a smaller number psychiatric treatment—may be of value, but such cases are a small minority. Some years ago the Director of the Institute for the Scientific Treatment of Delinquency suggested that 10% of all adult offenders might benefit from psychiatric treatment.[3]

The problem in fact is sociological rather than medical. It is the problem of inducing some sense of social obligation in people whose impulses seem to be entirely selfish. For the solution of this problem, though religious, educational, and economic influences may all play a part, a wise and understanding administration of the law, aimed not only at the protection of society but at the reform of the criminal, is essential. The new Bill would have gladdened the hearts of John Howard, Jeremy Bentham, and Elizabeth Fry in its emphasis on prevention and reformation rather than retribution. We assume that it has the support, as its predecessor had, of the Prison Commissioners, whose office it may abolish, prison governors, visiting justices, and discharged prisoners' aid societies. It is something to sweep off the statute book in their entirety the various Whipping Acts, Hard Labour Acts, and Transportation Acts which have stood there as a confession of our failure since the early nineteenth century.

[2] *Report of the Mental Deficiency Committee*, 1932.
[3] B.M.A. *Report of Committee on Mental Health*, 1941, p. 9.

TOXIC FACTOR IN BURNS

Controversy still continues on whether or not there is any important toxic factor involved in the illness which follows severe burning. Systematic biochemical studies[1] at Oxford failed to reveal any burn "toxin." A proteinase was found which might play some part in local blister formation, but the effects of this substance are apparently neutralized should it enter the blood stream. Later in the course of the illness losses of body weight, simulating a toxic state, were found to be associated with a negative nitrogen balance which could be corrected by increasing the intake of protein. This deficiency state is induced by an increased demand for tissue protein. These systemic reactions follow the immediate local effects of the burn with fluid loss into the burnt area and consequent haemoconcentration. Other systemic reactions may be associated, of course, with complicating infections.

Prinzmetal and his co-workers[2] have shown that when rats are burned and subsequently bled to death the amount of blood obtained from the animal is reduced compared with that collected when normal rats are bled. This reduction in volume is not necessarily accompanied by haemoconcentration and is therefore not due to diminution of the actual blood volume. Post-mortem examination of the animals shows renal congestion, compared with the pallor of the kidneys in otherwise normal animals bled to death. In a further paper[3] from the same laboratory the authors describe how the infusion of blood from a burned rat into the aorta of a normal rat proximal to the renal artery reproduces this picture of renal congestion and capillary atony in the kidney of the recipient. This evidence certainly seems to suggest the presence of some vasodilator substance in the blood of these particular burned rats.

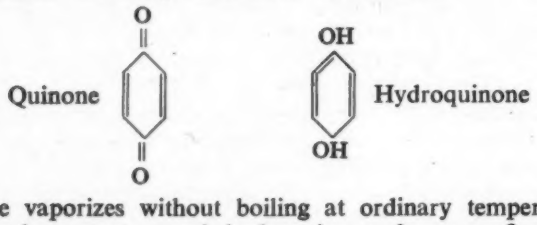
Before assuming that a similar "toxin" may be produced in burnt human beings, it would be well to keep in mind some points about the nature of these experiments. Prinzmetal's rats were anaesthetized and immersed up to the neck in boiling water for 20 seconds. It is quite clear that this procedure would produce an intense hyperthermia in the animals, and the only comparable human burn would result from being ducked in boiling water. The local action of an extensive scald is unlikely to raise body temperature significantly. Before Prinzmetal's results can be applied to the pathology of human burns, we should hear more about control experiments on the effect of gross rises of body temperature.

[1] Peters, R. A., *Brit. med. Bull.*, 1945, **3**, 81.
[2] *Clin. Sci.*, 1945, **5**, 205.
[3] Prinzmetal, M., Bergman, H. C., and Kruger, H. E., *J. clin. Invest.*, 1946, **25**, 781.

QUINONE AND HYDROQUINONE AS INDUSTRIAL HAZARDS

Hydroquinone is well known to amateur photographers as a developer. An ophthalmologist practising in Kingsport, Tennessee, where the Eastman Corporation have a factory which makes developers and other photographic products, saw a number of workmen who had brown stains on their conjunctivae. Investigation soon showed that there were as many as 50 cases of conjunctival staining or corneal opacity among men who had been in contact with either quinone vapour or hydroquinone dust. This sequence of events, which is classical in industrial toxicology, is described in two recent papers[1 2] on the noxious actions of quinone and hydroquinone.

The ocular signs of the condition were in the interpalpebral fissure. The conjunctiva showed minute spherical deposits of brown or black pigment and the cornea a superficial green-brown stain and—of more serious significance—greyish white opacities at varying depths. Biopsy of the conjunctiva from one case revealed the deposition of large brown globules in the basilar cells near the basement membrane, and of a more finely divided and more widely distributed intercellular pigment. After removal from exposure the pigmentation gradually disappeared, but the corneal opacities remained; apart from the ocular condition no haematological or other systemic effects could be detected. The degree of eye injury was correlated with the length of time the workmen had been employed in the dangerous environment, though there were marked differences in individual susceptibility. Staining of equivalent severity developed in one man in one year and in another in over 13 years. That the toxicity of a substance is largely a function of its physics and chemistry is underlined in this study. Both quinone and hydroquinone are unstable water-soluble reducing substances of formulae:



Quinone vaporizes without boiling at ordinary temperatures and pressures, and hydroquinone forms a finely divided dust. The stage is therefore set for atmospheric contamination and subsequent solution in body fluids and tissues.

When a poisonous vapour is involved in an industrial process, ideally, its escape should be prevented by completely enclosing the chemical system used in the process; failing this, the vapour should be removed at the point of production by exhaust ventilation, or diluted with large volumes of air to a previously determined safe concentration. A combination of these methods was applied by the Eastman Corporation. A colorimetric method was devised for estimating the concentration of quinone in the atmosphere, and the upper safe limit was fixed at 0.1 parts per million. The accepted criterion formerly had been the bearable level of ocular irritation, which was found to correspond to a concentration as high as 0.8 parts per million. The method employed depends upon collecting the vapour in isopropyl alcohol, developing the colour with phloroglucinol in potassium hydroxide, and then comparing the absorption spectra with previously prepared standards at a wave length of 520 m/μ using an Evelyn colorimeter. With the same technique the atmosphere at various points in the factory was sampled in order to check the efficacy of the newly instituted safety measures. For hydroquinone dust a level of 2–3 mg. per cubic metre was arbitrarily selected, pending further investigations directed towards determining the standard of absolute safety.

[1] Stemer, J. H., Oglesby. F. L., and Anderson Banks, *J. industr. Hyg.*, 1947, **29**, 60.
[2] Oglesby, F. L., Stemer, J. H., and Anderson Banks, ibid., 1947, **29**, 74.

TRUE HERMAPHRODITISM

True hermaphroditism is defined as the presence of both male and female gonads in the same individual. A review of the literature shows that it is a rare condition; only 38 cases proved microscopically have been reported. The sex of an individual was previously believed to be determined at the moment of union of ovum and sperm by the number of, or some intrinsic factor in, the chromosomes. Recent experiments suggest that other factors may play a decisive part in the determination of sex. Sisk and Cornwell state that abnormalities of genital development may result from endocrine imbalance in the mother or embryo. The normal growth of the genital tract depends on the continued development of the Wolffian elements and the simultaneous suppression of the Mullerian tract or *vice versa*. If the retrogression of the antagonistic elements is defective hermaphroditism results. Should the Mullerian and Wolffian elements be equally developed so that two ovaries, two Fallopian tubes, and a uterus coexist with two testes, epididymes, vasa, seminal vesicles, and a prostate, the condition is classified as true hermaphroditism bilateralis. If the Mullerian tract is developed on one side and the Wolffian elements on the other, "hermaphroditism lateralis" is the term used. Two such cases have been reported recently, one by Stirling[1] and the other by de Moura and Basto.[2] A much commoner condition is that in which ovarian and testicular tissue are present in the same gonad (ovotestis) with an ovary or testis or neither on the opposite side; this is classified as "unilateralis." An ovotestis was found on one side in a case described by Davis and Scheffey,[3] and in another case reported by Engle, Yeaw, and Lattimer.[4]

Advice is usually sought in early childhood on account of some external genital deformity, such as hypospadias or cryptorchidism, or at puberty because of abnormal secondary sexual characteristics. When the sex of a child was in doubt it was customary to advise the parents to bring him up as a boy; the male is three times more prone to deformity of the genitalia than the female, and the disadvantages are less if a mistake has been made. Garcia states that only by an exploratory laparotomy can the true sex be determined, and some authorities would insist also on biopsy of the gonads.

The question of treatment is complicated by anatomical, endocrine, and psychological factors. The aim of surgery will be threefold. First, it is necessary to establish a functioning genital tract of the sex which has been decided upon in the light of the laparotomy; this may be impossible because of some essential defect in the development of the tract, and even if the organs appear normal sterility usually ensues. Secondly, it is essential to remove all antagonistic gonad tissue if unfortunate secondary sexual characteristics are to be avoided. Finally, the external genitalia may need reconstruction. The secondary sexual characteristics may have to be stimulated by appropriate hormone therapy before and after puberty, and the psychological aspect of the problem must receive adequate attention. All these points are well illustrated in the remarkable group of four cases recently described.

[1] Stirling, W. C., *J. Urol.*, 1946, **56**, 720.
[2] de Moura, A. C., and Basto, L. P., ibid., 1946, **56**, 725.
[3] Ibid., 1946, **56**, 715.
[4] Ibid., 1946, **56**, 731.

BORAX AS AN INSECTICIDE

Before the advent of modern synthetic insecticides it was difficult to find any chemical substance toxic to insects which was not dangerous to vertebrates. Arsenicals and fluorine compounds present certain hazards when used against insects living in association with man or domestic animals. However, borax ($Na_2B_4O_7.10H_2O$) and boric acid (HBO_3) do combine moderate insecticidal activity with low toxicity to mammals. These compounds have been employed in ant baits and as dusts against cockroaches with some effect. But since ants and roaches are difficult to eradicate it would seem advisable to abandon borax for more highly insecticidal materials. Borax and boric acid have been applied successfully to the reduction or prevention of the breeding of fly maggots in manure.[1] Boric acid is more effective than borax, probably because it is more soluble and, weight for weight, contains more boron. The quantities required are 2½ to 3 lb. (1.1 to 1.35 kg.) of boric acid or 3 to 5 lb. (1.35 to 2.25 kg.) of borax per ton of manure. Farmers may view with caution, however, the possibility of building up a boron excess in the fields, especially with cereals which have low boron requirements.

Another use of boron against fly maggots has been reported recently from Australia.[2] There are a number of blowflies which, apart from the domestic annoyance they cause, are responsible for great losses by "striking" sheep—that is, causing a fatal myiasis. These blowflies can be controlled to a considerable extent by baited traps, but it has been found that the flies breed on the bait in the traps and many maggots escape to renew the natural population. It has been shown that borax added to the baits will prevent breeding in them without destroying their attractiveness.

EMPIRE MEDICAL BUREAU

The Council of the B.M.A. has decided to establish an Empire Medical Advisory Bureau at its Headquarters in London, and we would draw attention to an advertisement in this week's issue inviting medical practitioners with administrative experience and organizing ability to apply for the post of Medical Director of the Bureau, the work of which will be under the general direction of a Committee of Management. It has long been felt both by medical men from the Dominions and Colonies and by those who do their best to help them when they come to this country that there should be one place and one person to whom they can come for advice on the numerous medical and personal matters the solution of which would go such a long way to helping them to make their visit pleasant and profitable. Most medical men from the Dominions and Colonies come to this country with a view to obtaining postgraduate instruction. Great Britain now has a wealth of medical talent and experience which is unequalled in Europe. The reputation of British medicine has probably never stood higher than it does to-day, and we may justly be proud of the fact that some of the fundamental contributions to medical science during recent years have been made by men working in this country. Postgraduate education is now in the process of being put on a more firm footing with the development of the British Postgraduate Medical Federation, under the direction of Sir Francis Fraser. Although the facilities for this work are not yet available, men working in the principal medical centres in Great Britain are always pleased to welcome and to help the medical man and woman from the Commonwealth and Empire who come here to learn new things. Part of the work of the new Empire Advisory Bureau, therefore, will be to see that the Dominion visitor has all the information he wants about postgraduate study whether it is for the purpose of taking a higher qualification or for learning about new surgical and medical techniques.

In this country we perhaps tend to forget that the Commonwealth visitor arriving in England for the first time feels very much of a stranger, is faced with unfamiliar customs, and is naturally ignorant of those various details that can be so harassing to the stranger. An important part of the job of the Medical Director of the Bureau will be to see that the newcomer is put in touch with suitable lodgings and hotels, receives information about facilities for sport and travel, and is introduced to medical men in this country who are prepared to offer private hospitality. Through members of the Branches and Divisions of the B.M.A. it is hoped also to arrange that the man or woman doctor from the Commonwealth will be greeted as soon as he arrives, whether it is at an airfield or at one of the ports. Here indeed is a job well worth doing and one which will enable the holder of it to play a more than useful part in tightening the bonds that already exist between the medical men of Great Britain and the Commonwealth and Empire.

PURCHASE TAX ON DRUGS

The Chancellor of the Exchequer in his Budget speech on Nov. 12 proposed certain increases in the present rates of purchase tax. The tax on the doctor's traditional black bag will increase from the present 33⅓% to 50%. Most instruments will continue to be free from purchase tax, but the tax on the lamp in cystoscopes and ophthalmoscopes and similar instruments will be increased. More important, however, is the fact that a large number of drugs are likely to become subject to tax at 33⅓% of the wholesale price instead of 16⅔%. This increase will affect many of the alkaloids and barbiturates; thiouracil and digitoxin; quinine, mepacrine, and pamaquin; aspirin, phenacetin, and the bromides; cascara, liquid paraffin, and castor oil; and most of the extracts, liniments, tinctures, syrups, elixirs, and the like. Under the Purchase Tax (Exemptions) (No. 2) Order of 1945 penicillin and the sulphonamides, vaccines and sera, cocaine and morphine, and vitamins A, B, C, and D, except in ampoules for injection, are exempt from purchase tax, as are pethidine, procaine, and certain other preparations. The British Medical Association has already protested to the Ministry of Health against this increase in the cost to the patient of a wide range of prescriptions. Many of the drugs affected by the proposed increase in purchase tax are in constant use by the dispensing practitioner. A substantial rise in the cost of these medicines is bound to fall most heavily on the chronic sick. The Association has urged that the whole question should be reconsidered.

The Treasury is clearly interested in the revenue from the taxation of nationally advertised proprietary medicines. Penicillin and the sulphonamides, among other things, have been treated differently. They have not been subject to purchase tax and it has not been thought necessary to alter this exemption. Surely there is a case for widening what Mr. Dalton called the "free list" to include drugs which are just as essential to the treatment of the individual patient. It is illogical to apply a purchase tax to the treatment of toxic goitre or malaria while exempting from tax the treatment of pneumonia or gonorrhoea.

[1] Midgley, A. R., and Dunklee, D. E., *Univ. Vermont State Agric. Coll. exp. St.*, 1943, Pamphlet No. 5.

[2] Waterhouse, D. F., and Fuller, M. E., *J. Coun. Sci. Ind. Res.*, 1946, **19**, 321.

PHYSIOLOGY OF THE CEREBRAL MOTOR CORTEX: THE CONTRIBUTION OF CLINICAL STUDY*

BY

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ABRIDGED

[After a tribute to Sir Victor Horsley.]

The methods and the fruits of the experimental study of the motor cortex are known to us all, and the familiar diagrams in which the topographical localization of movements in this cortical region have been embodied by numerous observers look out on us from the pages of innumerable papers and text-books. On the other hand, this is by no means true of the remarkable contributions of the clinical method to the physiology of the motor cortex. Even contemporary clinicians commonly show an imperfect appreciation of their nature and significance, as may be seen from the unquestioning acceptance they give to the punctate theory of the localization of movements in the cortex, despite the numerous ways in which this theory conflicts with the clinical study of disorders of movement: while for the contemporary physiologist all this clinical work is an imperfectly explored world of phenomena and thought.

The last third of the nineteenth century was a period of great intellectual excitement for those engaged in the study, clinical and experimental, of the nervous system. As we read the original papers of the time upon this subject, naive as is their phraseology in some respects, we can recapture some of that excitement, and can realize how the experimental confirmation of Jackson's hypothesis of a localization of somatic function in the cerebral cortex, by Hitzig in Germany and by Ferrier in this country, stirred the imagination. Thus it was that the philosophic genius of Jackson, and the pioneer work of Ferrier which was stimulated by it, together opened what I have always looked upon as the golden age of British neurology. At this fortunate time Horsley began his work, and came to take his due place in the direct line of those, clinicians and experimentalists, through whom have flowed the two main streams of our knowledge of the cerebral motor cortex.

Experimental Contribution and Hypothesis

What has predominantly occupied the experimentalist during the seventy-five years of investigation of the motor cortex has been the progressively detailed charting and subdivision of the excitable region, and innumerable maps, from the simple ones of the pioneers to the beautifully detailed ones of Leyton and Sherrington, bear witness to the perseverance and accuracy with which these surveys have been carried out.

If the physiologist, absorbed in these studies, has concerned himself at all with the problem of the functional organization of the excitable motor cortex it is because his punctate electrical stimuli soon began to reveal to him a perplexing instability in the reactions of the cortex. The factors underlying this were later to be analysed by Graham Brown and Sherrington, but this analysis cannot be said to have had any deep influence upon the general conclusions formed by the following generation of experimental physiologists as to the plan underlying the representation of movements in the cortex. This plan is generally held to be that the motor cortex is a close-set mosaic of points in each of which is represented, or localized, a physiological unit of movement: "One spot, one movement" for the majority of physiologists, the whole making up a somatotopic projection of moving parts on the surface of the cortex.

There is an engaging simplicity about this conception that is in the true tradition of Newtonian physics, but it has progressively crumbled, almost unnoticed, until upon examination it is found to have no solid foundation. Horsley was one of the first to cast doubts upon its validity when he pointed out that there was no ground for the current assumption that the fragment of movement evoked by a momentary threshold electrical stimulus of a cortical point was all that the point really represented, and that in any case the stimulus was a grossly unphysiological way of exciting a nervous centre.

Graham Brown and Sherrington's analysis of the so-called cortical instability or liability showed that the activity of a cortical point is in fact influenced in a number of definite ways by its past behaviour, and its future behaviour by its present. To the conception of primary facilitation they added that of secondary facilitation with its consequences of the deviation and reversal of the response of a cortical point. These phenomena became the basis of Leyton and Sherrington's exposition of motor cortical function. In them they saw indications of the "rich mutual associations" of cortical points, associations by means of which the units of movement assumed to be represented in individual points were built up into the innumerable combinations and sequences that go to make the normal motions of the intact organism.

[The lecturer summed up the present position by saying that although the cortex is a labile organ, there has been added to it the notion of a perpetual flux of representation, so that the idea of fixed representation is gone, and to call the cortex labile or unstable gives us nothing in its place. Yet the punctate theory still appears to command the formal assent of physiologists, a telling example of the survival of what was once a useful working hypothesis until it had become an obstacle to the penetration of fresh and original thought to the problem of the motor cortex.]

It is a fair criticism of the experimental study of the motor cortex that it has stopped short of giving us a clear insight into the functional organization of that cortex, and that in some of its aspects current physiological opinion shows signs of regressing to a simplicity wholly inadequate to generalize the facts of observation. I venture to submit that this failure is not so much due to a lack of relevant facts as to one of conceptual thinking about them. We may discern at least three factors underlying this. First, successive generations have continued to interpret their findings on the basis of the original punctate localization theory, the permanent validity of which they have assumed. Secondly, they have departed from the conception of a representation of processes—that is, movements—in the cortex in favour of one of a representation of structures—that is, muscles; and thirdly, in coming to their conclusions they have left out of account, by a sort of unawareness, all those facts of observation that did not harmonize with the theory; thus giving an example of the insufficiently recognized truth that the relevance of evidence is always dictated by theory, a quality inherent in the observational order of experience.

[After this brief and somewhat critical review of a vast body of experimental work with its great merits and obvious limitations, the lecturer turned to his main theme, the clinical contribution, which this introduction brought into relief.]

The Clinical Contribution and Hypothesis

That these studies have almost from the first taken a very different path from the one we have just traced we owe to two circumstances: the one inherent in the clinical method, the other fortuitous.

The limitation inherent in the clinical method is that Nature makes the experiment, and not the observer. She makes it how and when she likes, seldom as we should desire to have it, and still more seldom under the eyes of someone interested to assess its significance in terms of physiology. "Experiment," it has been said, "is nothing else than a method of cooking the facts for the sake of exemplifying the law"; but the clinical observer has to take Nature's facts in the raw, and to elicit Nature's laws in these circumstances may be a high adventure of thought.

The second and fortuitous, though most happy, determinant was that the pioneer in the field, Hughlings Jackson, chanced to be at once a scrupulously accurate observer and a man of philosophic genius. He was quick to recognize that once the fact of a topographical representation of movements in a cortical region was established, the further and more precise mapping of that region could be left to that experimental method which Ferrier had begun to show was so eminently suited to the task. He was thus free to turn to what was

*The Victor Horsley Memorial Lecture delivered at the National Hospital, Queen Square, on Nov. 27, 1946, and here abridged. The complete lecture is published by E. and S. Livingstone, Ltd., Edinburgh; price 1s. 6d.

for him the more congenial task of analysing the nature of this representation. To this end he adopted what he called his "double plan": namely, the parallel study of the consequences of destroying and of discharging lesions, that is, of paralyses and of those convulsions beginning unilaterally that we now speak of as Jacksonian fits. In one of his papers Jackson says:

"I considered convulsive seizures and certain cases of paralysis with regard only to the localization of movements in the brain. What interested me most was, not so much the localization of movements in the cerebral hemisphere in the sense that, for example, the movements of the foot are localized here and those of the arm in another place, but the facts of the cases as they bore on a broad principle of localization."

Here, surely, is the authentic method of science, philosophically considered, with its observational and conceptual elements, and here, thus early, the clinical study of the motor cortex set its course for a different goal from that sought by the pioneer experimentalists. For myself, I know of no more fascinating episode in the history of clinical medicine in modern times than Jackson's intensive study of the convulsion beginning unilaterally, as he called it, and the masterly fashion in which he made it yield up so many of the secrets of the cortical organization of movements.

[The lecturer described as the classical example of the "discharging lesion" the Jacksonian fit, and of the "destroying lesion" hemiplegia in all its grades of severity.]

We have learned that, *ex hypothesi*, the motor cortex is a mosaic of discrete points in each of which a muscle or a unit of movement is represented, and, from what we have heard, all these points are to be thought of as equipollent. How remarkable it is, then, that the Jacksonian fit, with this vast and complex representational mosaic at its disposal as it were, should invariably choose to fire off in one or other of three cortical foci: that for thumb and index movements; that for movements at the angle of the mouth; or that for movements of the hallux, and in that order of frequency. An inevitable result of this selective incidence of the discharging cortical focus, for which nothing in the literature of experimental physiological studies has prepared us, is that the Jacksonian fit begins in what has been called a leading part (a part having the greatest number of different movements at the greatest number of different times)—namely, hand, face, or foot. From these observations Jackson concluded that these three cortical foci—"physiological fulminates," as he called them—possessed the lowest threshold of excitability in the motor cortex. Again, in respect of each point of onset of the fit there are certain uniform sequences of spread. Of equal significance as a general characteristic of the fit is that it spreads in a uniform sequence. In respect of the discharging lesion itself, Jackson believed that though this might be restricted, it could yet lead to a widespread convulsion.

Paralyses of Movements

Tracing the general features of hemiplegia, the effect of the destroying lesion, we find that they include the maximal incidence of impairment or loss of movement in the same three leading parts we have already considered—hand, face, and foot, in that order. As hemiplegia increases in severity, or in the comparative study of a series of progressively more severe examples, we see the same compound order of involvement that we found to be characteristic of the Jacksonian fit: as paralysis spreads to include more movements it deepens in the movements first affected.

Now hemiplegia is usually the sequence to a destroying lesion of the motor pathway deep to the cortex, the way out from the cortex, but the study of limited destroying lesions of the cortex itself reveals that the general characters of the paralyses observed are the same in each case. Nevertheless there are certain significant features of destroying cortical lesions to be considered. As Jackson expressed it, the cortex is very tolerant of destroying lesions. If such a lesion be very restricted it may be symptomless, and when productive of paralyses these are apt to be minimal in range and severity and to be capable of a high degree of restoration. Nevertheless, this apparent restoration is not truly complete, for of all the possible movements of a given part some remain absent, but are largely compensated for by other and similar movements of the same part. This so-called "tolerance" of destruction, the high degree of recovery after a destroying lesion, and the nature of the compensation achieved are all incompatible with the theory of an exclusive representation of movements in certain fixed points.

Summing up, then, we have primary involvement of leading parts in paralysis, compound order of paralysis of movements in the same sequence as that of convulsion in the Jacksonian fit: tolerance of the cortex to localized lesions, extensive recovery and partial compensation of lost movements by similar movements of the same part. Thus convulsion and hemiplegia are the positive and negative of one picture, and convulsion "the mobile counterpart of hemiplegia." The destroying lesion reveals yet another feature inherent in the organization of the motor cortex—namely, that it is movements and not muscles as such that are represented. "The cortex knows nothing of muscles, it knows only of movements," as the familiar aphorism of Jackson's has it, and it must at this date strike the clinician as remarkable that any should be found to dispute it.

In the matter of paralysis there is no evidence that a single muscle can be paralysed by a cortical lesion in man. It is doubtful whether in the experimental animal after a cortical ablation any conclusive finding on this matter is possible. On the positive side there is ample clinical evidence that paralyses from cortical lesions and in hemiplegia are paralyses of movements and not paralyses of muscles as such. One of the most familiar examples is provided by the behaviour of wrist extensors in many cases of residual hemiplegia: those in which the power of voluntary clenching of the fist is retained but that of voluntary extension of the wrist is lost. In the former movement the wrist extensors can be seen and felt to contract powerfully, while on the attempt to extend the wrist nothing happens and the muscles remain inactive. As synergists in the first movement they act, as prime movers in the second they are paralysed. Even more striking instances are recorded by Beevor (one of Horsley's collaborators) in the case of movements of the trunk in hemiplegia, showing that muscles paralysed for certain movements retain their full power in others.

[After adducing a philosophical argument against representation of structure—as opposed to process—in the cortex, showing that it can only be the *performance* of the muscle as a moving structure that can be represented:—]

Clinical observation has shown that the motor cortex predetermines the combinations in which muscles shall act simultaneously, and also the sequence in time, the order of action, in which they enter into a voluntary movement. These are those cortical functions of co-ordination in space and co-ordination in time of which Jackson spoke and which Beevor so abundantly exemplified and recorded in his Croonian Lectures (1903).

Jackson's Theory of Representation

At an early stage Jackson found himself compelled to discard the punctate or "cortical muscle" theory of localization of movements as being incompatible with the facts of observation and inadequate to generalize them. What has been spoken of as the tolerance of the cortex to destroying lesions, and the remarkable degree and kind of recovery of movement seen after such lesions, could not occur with a cortex so organized. Similarly, the compound spread of convulsion from discharge of a restricted cortical focus is equally impossible on this basis. Jackson therefore concluded that representation of movements must be multiple in the sense that a given cortical focus must contain the anatomical and physiological substrata of more than a single movement, and that the representations of the movements of a given moving part are not abruptly demarcated and merely contiguous but extensively overlapping.

Implicit in this view, and in strong contrast to that of the experimental physiologists, is the notion that what the motor cortex represents, what is "localized" there, is not a vast collection of elementary units of movement, waiting to be assembled *ad hoc* into those complex combinations and sequences that we know normal voluntary movements to be, but a field in which all possible movements—all the movements the individual has ever learned—have their own separate representations in so far as they differ from other movements. There is, in fact, no conclusive evidence that any hypothetical "units" of movement are represented as such in the cortex.

The hypothesis of multiple and overlapping representations allows of an integration of all the phenomena of facilitation with the known facts, and we no longer have to suppose that what deviation and reversal of response really signify is that a given representation actually changes its location from place to place and moment to moment, and that cortical representation is in a perpetual flux.

[Only on the basis of Jackson's theory of representation was it possible to account for the clinically observed facts. But in the field of experimental physiology the facts pointed to the same conclusions.]

The notion of multiplicity of localizations of movements in a single cortical spot stands out clearly enough from a great number of experimental observations. Thus it has long been known that if the faradic stimulus to a cortical point be prolonged a sequence of primary, secondary, and tertiary movements, as they have been called, can be evoked, and these involve a spreading field of musculature.

[The lecturer quoted from Horsley's Linacre Lecture in which he had drawn attention explicitly to the fact that multiplicity of representations at a single focus had always been an inference that could be drawn from experimental observations; also the recent work of two American physiologists, Murphy and Gellhorn (1945), who, using supra-threshold condenser discharges as their cortical stimuli, had found multiplicity of representation throughout the motor cortex of three animal types—rabbit, cat, and monkey—and also extensive overlap of representation, transcending the boundaries of the three great somatotopic regions, those of the head, upper limb, and lower limb. This multiplicity of representation persists in an isolated cortical focus and is not due to spread of current over adjacent areas of cortex.]

This consummation must be profoundly moving to whomsoever has been bred in the tradition of the great neurologists of the turn of the century. At last a great adventure of thought has come safely to port, and in the words of a phrase from Pope's *Essay on Man*, the motor cortex has been shown to be "A mighty maze! but not without a plan." Just as seventy-five years ago the clinically ascertained fact of a localization of somatic function in the cerebral cortex obtained its brilliant confirmation at the hands of Ferrier, so now the hypothesis as to the nature of that localization, based upon clinical observation and formulated so long ago, finds an experimental verification in the laboratory at the hands of two American physiologists. Now this clinical hypothesis may be regarded as valid on its own merits, and not in need of any further verification.

Conclusion

The material and the conditions out of which the clinical investigator has to forge ordered knowledge are a constant challenge to his capacity for conceptual thinking as well as to his powers of observation. This chapter I have put before you is the story of the response to challenge. This particular challenge, which faces the experimental no less than the clinical investigator, is the challenge to conceptual thinking, a challenge we see so brilliantly met in the work we have been considering, or in that of Sherrington in the realms of experimental physiology. Science, it has been said, is formed by the meeting of the two orders of experience, observational and conceptual, and the former can be interpreted only in terms of the latter.

How appropriate to our thought of Victor Horsley is the conception of challenge and response, for his full and eager life was a series of responses to challenge. His name and fame are part of the imperishable tradition of medicine.

Medical practitioners might like to draw the attention of paraplegic patients to a new quarterly journal entitled *The Cord*. The journal may be ordered from the Editor, Paraplegic Branch of the British Legion, Stoke Mandeville Hospital, Aylesbury, Bucks, a year's subscription costing only 2s. Though the journal is issued by the Paraplegic Branch of the British Legion it will cater also for the interests of those paraplegics who are not members of the Legion. It will provide information about appliances and medical treatment suitable for paraplegics, and how they may best be obtained. General problems of housing and employment will also be discussed. The present number contains an entertaining short story, and announces the offer of a two-guinea prize each quarter for the best short story submitted by a paraplegic reader.

A SUGGESTED HOSPITAL UNIT

BY

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For some time it has been evident to me that the private or pay block in a hospital is obsolete. In such a block the segregation is based on social and not on medical grounds and the patients lose the advantages that the less affluent obtain from specialized nursing and equipment. While by no means an advocate of specialization to the extent that many consider advisable, whereby a "special centre" is necessary before any malady can be treated, yet I think there can be no doubt that a reasonable degree of specialization is an advantage. I am convinced that this applies as much to the nursing as it does to the medical profession, or even more so. I have on many occasions heard surgeons remark that their cases do better in both the public and private wards of special hospitals restricted to the type of work concerned than do similar cases in nursing homes or the private blocks of general hospitals.

Sisters and nurses tend to be interested in special aspects of their work. Thus in a general pay block a fractured femur may be nursed by a sister specially interested in diabetes, and the requisite special equipment is not available, or, if it is, the staff are not familiar with it. It is for these reasons that private beds have been provided in special hospitals. Not only does this apply particularly to fractures and orthopaedic cases, but it applies to genito-urinary, chest, and abdominal surgery, neurosurgery, and gynaecology.

In my opinion, the ideal conditions are those in which a surgeon works as part of a self-contained team of agreeable and co-operative colleagues, medical and nursing, in a self-contained unit having all the facilities required for the efficient execution of his work, both public and private. The unit should therefore have general and private wards; it should, in the case of a surgical unit, have operating theatres, and an *x*-ray room for pyelography, salpingography, encephalography, or the correction of fractures, depending on the type of work engaged in. It is hard to think of any major surgical division that does not, for its finest technique, require the help of *x* rays. There should be facilities for out-patients, both public and private, and a small clinical laboratory. Under such conditions a good technique could be developed: no doubt each "firm" would plan its own special technique, and this might be the subject of friendly rivalry. In this manner the method could be judged by results. In a pay block it is difficult to get a special technique followed in detail, and the procedures are apt to be a blend of the ideas of several surgeons—so often the best features of each method fail to be incorporated in the blend, and one often feels that the *exact* technique of any competent surgeon (if one cannot get one's own) would be better than a hotchpotch of many.

I have been thinking of these things for many years, but I have been stimulated to put my thoughts on paper by the inspiring article by J. C. Spence on the subject of children's hospitals (*Journal*, Jan. 25, p. 125). I submit, as an illustration of what I mean, a plan kindly drawn up for me by Mr. Owen Watson, A.R.I.B.A., and his staff. It does not profess to be perfect in detail, and as I have already put these experts to a great deal of trouble by alterations and revisions I have refrained from further alterations as the plan illustrates my theme. There is, however, one detail that strikes me as needing changing—the plaster room should adjoin and communicate with the *x*-ray room, and it might be an advantage for the laboratory to communicate with the theatre suite. The private wards would be better grouped in one group and should not face the back of another building. Obviously, if such a plan were to be drawn up in connexion with a proposed hospital the nature of the treatment to be carried out there and the available site, as well as the personal views of those who were to work in the unit, would make considerable alteration necessary. I therefore feel that at this stage there is no need to ask for the plan to be redrawn to provide for comparatively trivial revisions.

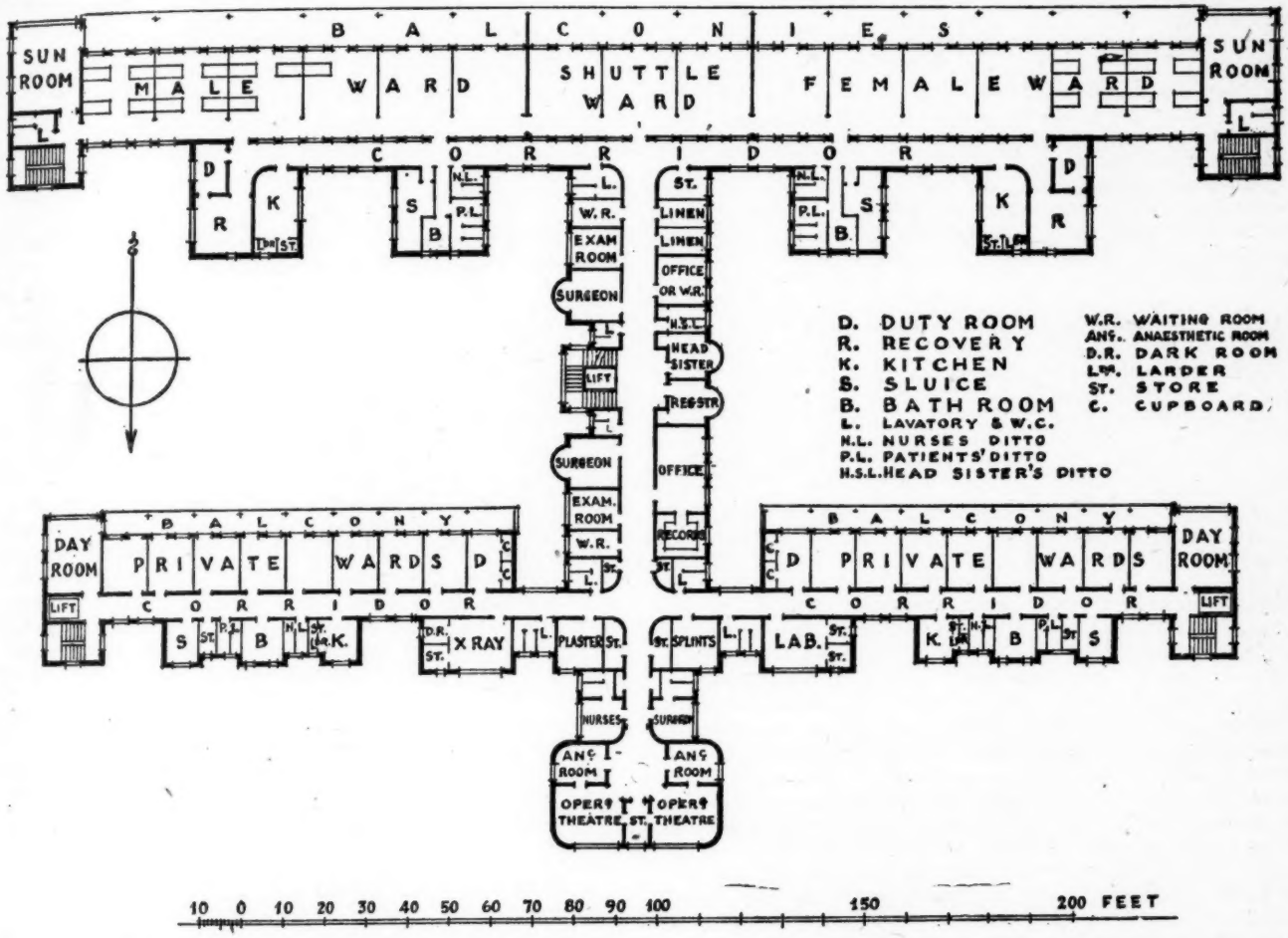
Accommodation

The following are the main provisions in carrying out the scheme.

General wards: male, female, and shuttle
Private wards (single rooms)
Theatre and anaesthetic rooms
X-ray and developing room
Plaster room if the unit deals with orthopaedic or fracture cases
Splint store and store for Balkan beams, etc.
Resuscitation ward
Balconies adequate to accommodate a fair number of beds

There are, however, certain features to which I would draw attention.

Shuttle Ward.—To those not acquainted with this feature I would explain that a shuttle ward is one which forms an annexe to either the male or the female ward, it being situated between the two and with a door leading into either ward at each end.



By opening the door into the male ward and closing that into the female ward the shuttle ward becomes an auxiliary male ward. It has no kitchen or sanitary accommodation, and is therefore cheap to build; it uses the kitchen and sanitary arrangements of the ward with which it communicates. This arrangement enables fluctuations in the number of each sex awaiting admission to be dealt with. If there was a big female waiting list, the shuttle ward could be used to reduce this by becoming a female ward, but if as a result a small hold-up of male cases occurred the shuttle ward could become a male ward for a week or two, and so on.

Private Wards.—Some advocate that two or three patients should share a room. This is satisfactory for trivial illnesses or for convalescents who are particularly sociable, but those who have shared a small ward with a patient taking two or three days to die of general peritonitis will need no further argument to convince them that, generally speaking, private single rooms are better. For myself, if I could not have a single room I would prefer to share with twenty rather than with one, as I should not be so likely to have such close contact with a distressing case. Attempts to reserve the single rooms for bad cases break down in practice, I find. If single rooms are provided, the private wards need not be separated for the sexes any more than are the rooms and floors in a hotel.

Resuscitation Ward.—The question of a resuscitation ward must be considered. It has advantages in the way of equipment and facilities, but there are objections. A much better relationship exists between nurse and patient when the nurse who has cared for him *in extremis* also nurses him through his convalescence: it is encouraging to the nurse and builds up a keen and happy spirit in the clinic. The beneficial influence of the gratitude of patients to the nursing staff is familiar to all who have worked in hospitals, and many patients make a point of returning when fully recovered in order to thank the sister of the ward and to bring her some flowers. On the other hand, it is an advantage to segregate a desperately ill patient, and to be able to come and go without disturbing the other patients; to use bright lights instead of groping to do an intravenous transfusion in the semi-obscurity of shaded lights, and to carry out all noise-producing procedures without disturbing other patients. The patient in such a ward is usually oblivious to the general turmoil.

It seems that both these advantages could be secured by having a recovery ward attached to each general ward. In the plan it is shown as having an observation window into the duty room. The ward staff, supplemented if necessary, could look after the very ill patient, would not lose contact, and would have the joy, if successful, of seeing the patient reach convalescence. On the other hand, if resuscitation failed, their disappointment and distress would be mitigated by the fact that they are not entirely engaged in this rather wearing occupation.

In the case of single private wards, there are few advantages in having a separate resuscitation ward.

Personnel

This is not the place to enter into details, but certain principles should be established. To ensure unification there must be

unified control. There should, on the medical side, be one surgeon in charge of the whole unit. On the nursing side there should be a senior sister as unit sister, with theatre and ward sisters under her. She might combine her duties with a double appointment, as, for instance, unit sister and sister-in-charge of a ward or the theatre. On the other hand, she might take charge of wards or the theatre when the sister in direct charge of these is away, and she could advise and help the staff nurse, whose relative lack of experience should make her welcome such support.

The second principle is that of continuity. In many hospitals a complete change of residents occurs periodically, and the new resident has to spend a week or two finding his feet, with a consequent drop in efficiency. It is an advantage in any unit to have a senior and a junior house-surgeon. The junior becomes in time the senior and by that time is familiar with the work of the unit, and the newly appointed junior is supervised and helped by his senior, especially in the earlier weeks of his appointment. This principle should extend throughout the clinic. It does not follow that one man need progress all the way, held up for years by lack of vacancies, but new blood can be introduced at various levels without, however, a complete rupture of continuity. One sees in some municipal hospitals the ill effects of neglecting this principle. Whole-time surgeons are appointed without adequate deputies, and every time a fresh appointment is made a new man arrives, often with little or no introduction. He does not know any of the old patients, or the methods and traditions of the hospital. He inevitably finds a certain number of failures, for whom he feels no responsibility and little affection.

Continuity on the nursing side would be obtained by having several sisters and a unit sister.

Other Features

The importance of adequate clinical notes and records is universally recognized but as a rule most inadequately provided for. In this plan provision is made for a records office and accommodation provided for typists and clerks to help in keeping adequate and—what are too often lacking—legible clinical notes.

I do not wish to give the impression that I favour special hospitals: I am entirely opposed to the further creation of such hospitals. I feel that constant contact with those engaged in other branches of work is good for both doctors and nurses, and prevents isolation and a narrow outlook. In my opinion a general hospital should consist of a collection of units such as I have described above with a central administrative block containing, amongst other things, staff dining and common rooms where meeting one's colleagues in various branches would be automatic.

Space prevents further elaboration of this scheme, but enough has been written to present the idea as a subject for consideration, discussion, and development by those interested in the welfare of clinical medicine and surgery and the improvement and advance of our hospital service. It would be a great relief, I feel, to have one's work centralized, and not to waste one's strength and energy in transportation and in toiling up flights of stairs in inadequate nursing homes carrying bags of instruments and appliances, with the fear that the one instrument that may really be needed has been left at home; having to make do without such aids as suction or portable *x*-ray apparatus, and with no trolleys or lifts to carry the patient from the operating table to his bed. Surely what is best for the patient is best for us all; the finest work demands that all the most up-to-date facilities and aids should be available whenever required, and the practitioner's energies should be conserved and directed to the work for which he has prepared himself by years of study and experience and not be dissipated in trivial but fatiguing tasks.

At a meeting of the North of England Obstetrical and Gynaecological Society held recently Mr. F. J. Burke described a case of theca-celled tumour of the ovary. The patient was 74 years of age; the menopause had been 22 years previously. She had been a spinster until the age of 72. Apparently some rejuvenation had taken place, for sexual desire and marital intercourse were normal. She stressed that her marriage was the great event of her life. A theca-celled ovarian tumour weighing 20 lb. (9 kg.) was removed.

Preparations and Appliances

NON-CLOTTING NEEDLE FOR INTRAVENOUS INJECTIONS

Drs. G. P. Fox and J. H. Taylor, London Hospital, London, E.1, write: The increasing use of the intravenous route for anaesthesia brings the problem of maintaining the patency of an indwelling intravenous needle into special prominence. While on a visit to Stockholm in 1946, one of us (J. H. T.) was impressed by a needle devised by Dr. Torsten Gordh, of the department of anaesthesia at the Karolinska Hospital, and made by the surgical instrument firm of Stille.

This needle is the essence of simplicity and efficiency, and was fully described in *Anesthesiology* (1945, **6**, 258). It consists of a shaft 3 cm. long of about 20 s.w.g., with a slightly thickened shoulder-piece 2.2 cm. in length, upon which is mounted at the end and at right angles to the shaft a small upward prolongation, surmounted by a detachable screw cap within which is a tightly fitting rubber diaphragm of 1.5 mm. thickness. The shoulder-piece is fitted with a thin-winged fin which lies snugly on the patient's skin and is maintained firmly by a strip of adhesive strapping. The overall length of the needle is 5 cm.

The patient is anaesthetized with a preliminary dose of thiopentone, and as soon as he is unconscious the needle is inserted into any convenient vein of the forearm or hand and maintained in position by the strip of adhesive strapping encircling the shoulder wing and the patient's arm. Further injections are made as required by piercing the rubber diaphragm with a very fine hypodermic needle mounted on a 10-ml. syringe.

The principle upon which clot formation is prevented is that blood cannot flow back into the needle once it is within the lumen of the vein since the distal end is closed by the rubber diaphragm. It is advisable before inserting the needle to inject a little of the anaesthetic fluid through it so as to expel any air which may have entered the needle through removal of the screw cap during sterilization.

The needle is easily sterilized by boiling, and the life of the rubber diaphragm varies with the extent of its use, but using only very sharp fine hypodermic needles a diaphragm will last from two to four months. No additional apparatus is required, and even an arm-board can be dispensed with if a suitable vein is found near the wrist and the hand is kept on the pillow by the side of the patient's head. We have used this needle now for over a year, and have never encountered clot formation within it, even when it has remained *in situ* for over four hours; neither have we seen any thrombosis higher up the vein, provided the needle is kept firmly within the lumen by means of the adhesive strapping. The uses to which this Torsten Gordh needle can be put are many. The anaesthetist will find it of service particularly when employing a thiopentone–nitrous-oxide-oxygen combination using intermittent, fractional doses of thiopentone and tubocurarine. In this case, since thiopentone and tubocurarine together form a dense precipitate, it is necessary to inject a small quantity of sterile saline after each injection in order to prevent the formation of such a precipitate.

Recently a minor modification of this needle has been made for us by Blease Anaesthetic Equipment, Ltd., of 223/7, St. John Street, London, E.C.1. The shoulder wing has a thin rubber arm-band and buckle attached to it and this makes for easier fixation to the forearm without the use of adhesive plaster. In addition, the screw cap embodying the diaphragm is mounted at an angle of 45 degrees instead of at right angles, thus streamlining the needle, which is then less likely to project from the arm.

LONDON MEDICAL EXHIBITION

The London Medical Exhibition, organized by the *British and Colonial Druggist*, returned to the hall of the Royal Horticultural Society, Westminster, last week with a varied display of products of interest to the medical profession. Quite half the 167 stands were devoted to the showing of chemical, pharmaceutical, and food products, the remaining exhibits being chiefly surgical and orthopaedic instruments, hospital and operating-theatre furniture, and special appliances for diagnosis and treatment. Unlike the exhibition of last year, when, after wartime dormancy, many new products were shown, the new introductions on this occasion were few and minor, but the exhibition excelled more than ever in the ingenious way in which the products were presented.

Many of the manufacturing chemists had illuminated models showing their products in action. This art of presentation was remarked particularly at the stands of Roche Products, Ltd., with its mural display of research workers and clinicians in the field of nutrition before and since the beginning of the vitamin era; Parke, Davis and Co., with its panorama of pharmaceutical research; and the decorative displays of Bayer Products, Ltd., the Crookes Laboratories, Allen and Hanburys, Ltd., and William R. Warner and Co., Ltd., with a relatively small range of products excellently shown. Imperial Chemical (Pharmaceuticals), Ltd., showed a more or less continuous programme of medical films illustrating anaesthetic techniques, and the British Oxygen Co., Ltd., had a big-scale exhibit of apparatus for the administration of anaesthetic gases. Of surgical instruments there appeared to be more than the former variety and abundance. One stall was entirely devoted to hospital equipment in stainless steel and another to surgical rubber. Hearing aids, electrical and non-electrical, were exhibited at several stands and rivalled ophthalmic equipment. Half a dozen bookstalls, three stands devoted to British spas—Bath, Buxton, and Harrogate—and such refreshing exhibits as those of Cadbury Bros., Ltd., and Bovril, Ltd., made attractive corners.

Reports of Societies

SNORING

In the Section of Laryngology of the Royal Society of Medicine on Nov. 7 Mr. IAN G. ROBIN read a short paper on "Snoring"—a complaint which was often a distressing physical and mental handicap. There was a remarkable lack of literature on the subject. Most physiology books devoted one line to it, and some journals of hygiene in America mentioned it in a breezy "lay" manner. Some useful information, however, was to be gained from recent work by anatomists and orthodontists.

Noisy respiration during sleep might be produced by various structures in the respiratory tract. He limited snoring to sounds made by vibrations in the soft palate and posterior faucial pillars during sleep. Whillis had shown that the vibrating part in a snore was the thin edge, or velum, of the posterior faucial pillars, and that if there was a reservoir of air filling the nasopharynx the velum could not vibrate. The vibrating parts were influenced by the relative position of the tongue and soft palate and by the texture of the velum. After a discussion of the position of these structures, the effect of the tone of the glossopharyngeal musculature, and other factors, Mr. Robin said that often it was the minor degrees of nasal obstruction which led to enough mouth-breathing to initiate snoring. These included slight deflection of the septum, collapsed alae nasi, or moderate mucosal congestion. Pathological changes in the pharynx might make the soft palate and faucial pillars more liable to be in a suitable state for snoring.

The majority of cases of snoring in children were cured by the removal of adenoids and tonsils. Exceptions were the cases of persistent mouth-breathing of functional origin and cases with infective or allergic rhino-sinusitis. It was rare for snoring to persist into adolescence. Even at puberty, when there was increased vascular congestion, there were not many snorers. The child snorer did not progress into the adult type unless there was persistent nasal obstruction, nor did the adult snorer necessarily give a history of snoring as a child. The young adult who started snoring usually did so from some organic cause. The largest group of sufferers were elderly persons, and both men and women were affected. The majority had some functional derangement in the glosso-pharyngeal structures. Lack of tone seemed to be the fundamental cause.

Treatment

Of irrational methods of treatment the chief was amputation of the uvula, which used to be a popular practice, rarely giving much relief, though it might modify the depth and pitch of the snore. Of rational methods the first was removal or prevention of nasal obstruction, thus allowing for cessation of mouth-breathing. In some instances decongestive nasal drops before retiring would allow a peaceful night. In others, various nasal operations might have to be performed. "Benadryl" was useful in some cases. The second method was to change the position of the head, thus preventing the tongue from falling back. Many persons snored only when on their backs, and sometimes a cotton-reel sewn into the back of the pyjamas was effective. The third method was to alter the position of the tongue and soft palate and perhaps also the jaws by breathing, swallowing, and phonetic exercises, or by orthodontic "splints." The exercises aimed at training the central nervous system to regain proper neuromuscular control. The "splints" altered the shape of the mouth, which might guard against the tongue and fauces falling into the critical position. In all these methods it was necessary to regain proper central control of the soft palate and break the habit of an inverted reflex.

A further method was to keep the mouth closed during sleep by wearing an "andresin" splint (which was well tolerated by most children, but less so by adults), or by the simple expedient of a strip of adhesive plaster across the corner of the mouth. After a short time this was well tolerated by many patients. An adequate nasal airway was, of course, essential. Jerome Strauss advocated the injection of sclerosing solution into the pillars, but no high percentage of cures had so far been claimed. Mr. Robin felt that surgeons might have prevented much future snoring by their removal of tonsils and adenoids, leaving the patient with nothing but a fixed fibrous band instead of a mobile soft palate and faucial pillars. His conclusion was that snoring was a symptom of unbalanced breathing caused by a combination of several physical conditions. Remedies must aim at curing all and not only one of them.

In a brief discussion which followed, the President of the Section (Mr. A. J. WRIGHT) said that for many years it had been his custom to teach students that snoring represented nasal breathing through an obstructed airway with the mouth open, but he was now satisfied that that was incorrect. Some remarks were made on snoring in animals. Mr. W. H. BRADBEER said that the dog was the only domestic animal that snored, and Mr. V. E. NEGUS said that this was because in the dog the epiglottis lay below the palate. The horse, cow, and cat would be incapable of snoring, as he believed they could not breathe through the mouth. He had always understood that in birds the sound was produced in the syrinx, and very loud sounds might be forthcoming. Mr. H. V. FORSTER inquired whether trained singers, whose muscles should be much better disciplined, were accustomed to snore, and also whether snoring occurred after operation for cleft palate. Mr. ROBIN was of the opinion that if the operation for cleft palate was attended by a good result the child should be capable of snoring but capable also, with efficient training, of not snoring.

CARDIAC PAIN

A meeting of the Medical Society of London on Nov. 10, with Mr. W. E. TANNER, the President, in the chair, was devoted to a discussion on "Cardiac Pain."

Dr. WILLIAM EVANS said that after Heberden's classic description of angina pectoris there appeared to be nothing more to be said about cardiac pain; nevertheless he now detected a certain restlessness, an uneasy feeling that all was not well with

their knowledge of the subject. In the first place he wanted to discuss the term "angina pectoris" itself. Custom had associated "angina" with the heart, but the term was misused and abused, and dreaded by the patient. The loose terminology of "angina pectoris" should be left on one side and the more responsible term "cardiac pain" substituted. He also wished to see the term "cardiac ischaemia" substituted for "angina of effort."

The diagnosis of cardiac pain was founded on three cornerstones—the patient's narrative, the signs elicited on physical examination, and the electrocardiograph. The first two of these were insecure, and the electrocardiograph was the keystone. Pain over the heart was seldom a heart pain. A guide to the origin of the pain was often the way in which the patient described his symptoms. The patient with true cardiac pain would not over-emphasize or exaggerate; he dealt with his pain quietly and without recourse to rhetoric. He would describe it as tight, pressing, heavy, vice-like, dull, crushing, gnawing, boring, gripping. The patient with non-cardiac pain, on the other hand, would describe it as stabbing, shooting, sharp, pricking, knife-like, burning, niggling, stinging, piercing.

In cardiac infarction of the extensive kind diagnosis was simplified by the presence of obvious signs, which included shock, collapse, small pulse, distant heart sounds, and triple heart rhythm. In less serious attacks the blood pressure might sometimes give a clue, and another physical sign was cardiac enlargement. Triple heart rhythm would result from cardiac infarction either alone or when it had caused heart failure in hypertension. The auscultatory sound of triple heart rhythm in a patient with chest pain was without equal as a clinical test. Sometimes the triple heart rhythm would be due to the addition of a fourth heart sound coming in front of the first; this was met with when cardiac infarction had caused heart failure in hypertension. The other variety was due to the addition of a third heart sound following the second and was probably commoner.

Electrocardiography

Dr. Evans went on to ask and answer certain questions. Was the electrocardiogram of cardiac infarction or coronary thrombosis ever normal? He believed not. If this was true they must act on it in the future even more than in the past, and allow a normal electrocardiogram to exclude by itself the diagnosis of cardiac infarction, however much it might be upheld by the sudden impact of pain. Could the electrocardiogram provide early evidence of cardiac infarction? In his experience the changes were there from the start, not in their more obvious and stabilized form but none the less plain to see at the beginning of the attack. They need never wait in the false belief that the infarction must ripen before it produced its electrocardiographic effect.

The treatment of either cardiac infarction or ischaemia must be preceded by a clear-cut diagnosis. Enforced unwarranted invalidism was a cruel imposition at any age, most cruel when the autumn of life was clouded by unnecessary restrictions. For the doctor to miss a step here was to commit a wrong. Even when the diagnosis was withdrawn the real harm had been done, and the mental injury was lasting. The consequences of failure to recognize in a patient the marks of coronary disease were of equal moment. At these cross-roads, therefore, the doctor must read his signs clearly.

"Angina Pectoris"

Dr. JOHN PARKINSON said he was glad Dr. Evans had used the term "cardiac pain," but cardiologists would not use the term "angina pectoris" unless they were forced to do so. He objected to the term being thrown overboard. He did not believe that the average man to-day feared the term as much as he used to do. It was a rather serious matter to talk about removing a term which had been in existence since Heberden. The use of "ischaemia" for "angina of effort" also seemed to broaden the terminology until it became almost meaningless.

Dr. JENNER HOSKIN agreed that it would be a pity to lose the term "angina pectoris," though they should never use it before the patient, and its loose use on certificates was to be deprecated. "Effort pain" was probably a helpful way of explaining it to the patient. He did not agree with Dr. Evans that the electrocardiogram was always abnormal in simple angina of effort. He had seen several cases with a typical history of angina of effort in which the electrocardiogram was perfectly normal.

Dr. A. HOPE GOSSE said that in diagnosing angina of effort he relied on the distribution of the pain rather than on the electrocardiogram. It was not always substernal pain. It might be observed in the arm and forearm, sometimes in the form of a band around the wrist. It went up to the shoulder, the neck, the lower jaw and teeth.

Dr. R. W. COCKSHUT said that Dr. Hope Gosse had restored his faith in himself as a general practitioner, which had been imperilled by this reliance upon electrocardiography. Dr. G. A. SCHOTT showed radiographs of a number of cases in which the pain of angina of effort had been associated with other conditions. Dr. W. G. OAKLEY said that hypoglycaemia would produce cardiac pain in a patient who had coronary disease, though he could not recall any instance in which hypoglycaemia had produced cardiac pain in a patient without coronary disease. Dr. COWAN said that at a good many necropsies he had found quite definite infarction, but on going back into the history there was no evidence that the person had had any pain or had suffered in any way.

Dr. EVANS replied briefly to the discussion.

MEDICAL HYDROLOGY

INTERNATIONAL CONGRESS

The annual meeting of the International Society of Medical Hydrology was held in Rheinfelden, Switzerland, on Sept. 10–14. Members representing nine countries were present. At a council meeting before the congress Dr. Barnes Burt (Bath) was elected chairman of the council. The vice-chairmen are Prof. Franistek Lenoch (Prague), Dr. G. D. Kersley (Bath), and Prof. Walthard (Geneva); the treasurer, Dr. F. Clayton (Leamington), and the secretary Dr. Donald Wilson (Bath).

At the first session Prof. STAUB gave an address on the effects of neuro-humoral reactions following irritation of the skin, and Prof. VERZAR, of Basle, described recent investigations of the climate at high altitudes. Prof. PANCONI, of Zurich, emphasized that spa treatment was an excellent form of therapy after the acute stage of poliomyelitis, but care had to be taken to avoid the over-use of healthy muscles at the expense of the paralysed ones. The temperature of the baths used should be between 96°–100° F. (35.6°–37.8° C.): lower temperatures would be too cold to relax any muscular spasm which might be present, higher temperatures would be too exhausting for the physiotherapists directing re-educational exercises.

Prof. CAMPBELL, of Pontresina, gave an account of his experiences in the treatment of asthma on the Engadine at an altitude of 5,500 ft. (1,650 m.). Of children who had asthma 50% were completely desensitized in six months, 75% in nine months, and there was no recurrence when they returned to lower altitudes.

On the second day Dr. DONALD WILSON read a paper on balneotherapy in occlusive disorders and Raynaud's disease, and Prof. LENOCH discussed the treatment of thrombophlebitis. In the afternoon, at Schinznach Bad, there was a discussion, opened by Dr. NICHOLSON, on balneotherapy with sulphur water in non-rheumatic diseases.

The third day began with a discussion on spa treatment in rehabilitation after accidents and war injuries. Dr. MCCLELLAN, of Saratoga Springs, outlined the scheme which had been evolved by the American Army for the use of spas in the rehabilitation of the injured. Dr. BARNES BURT gave a short account of his experience with injuries during the war, and read a communication from the U.S.S.R. on methods of treatment of frostbite.

During the meeting members of the Society had much private hospitality offered to them, both by the Swiss members of the Society and by the members of the Swiss Society of Medical Hydrology and Climatology. This meeting coincided with the twenty-fifth anniversary of the International Society of Medical Hydrology.

Correspondence

Mental Health and World Citizenship

SIR,—Some of your readers will be familiar with this title, which is the general theme selected for the International Conference on Mental Hygiene due to assemble in London in August, 1948, as part of a rather larger Congress on Mental Health. This theme has been chosen deliberately in view of the present state of world affairs in the belief that many of us in medicine—not only in psychiatry—along with our colleagues the psychologists, sociologists, educationists, and others have an opportunity of learning to apply some of our understanding of individuals to the problems of group attitudes and international tensions. No doubt psychiatrists should be able to provide the central focus for much of the thinking that is necessary, but they certainly cannot do it alone.

This general theme of mental health and world citizenship has been broken down in a tentative way into various subjects for the different days of the Congress: "World Citizenship and Good Group Relations," "The Individual and Society," "Family Problems and Psychological Disturbances," "Industrial Relations," "Planning and Training for Mental Health." There are in London discussion groups or preparatory commissions composed of men and women from various allied professions, working each of them on one of these day's topics. In some 14 or 15 other countries there are already groups—in some cases, as in the United States, a great many—working on exactly the same topics. Their material as they produce it will be sent in to the central commissions in London, who hope to put it together and send out a monthly summary of all these various points of view to the other groups throughout the world.

This plan of preparatory action has been made because international conferences are often somewhat sterile, and we hope that in this case we shall be able to get a good deal of the work of the Congress accomplished before the meeting next August. At that meeting we actually want to exchange ideas and bring each other up to date in these matters. We hope that out of the work of these various preparatory commissions, which are of course on a national basis, and from the work of a residential International Group which we hope will meet before and after the Conference, we shall be able to clarify many of the points of agreement and disagreement. It should be possible to delineate many of the subjects which demand continuing research and inquiry in this medico-sociological field ; and we hope also to be able to arrive at some points of agreement, however simple these may be, which could be of assistance to those two important functional organizations of the United Nations, the World Health Organization and Unesco, in the tasks to which their constitutions have committed them.

In this country there are a number of groups being planned, but there are not yet so many as there might be. As chairman of the organizing committee of the Congress I am writing now in the belief that many of your readers will feel that this provides them with an opportunity for getting together with colleagues from their own and other disciplines to try and study these topics and see what contribution can be made towards the solution of some of these major problems. Usually when one talks in any gathering about the general purposes of the Congress, about our intention to experiment in presenting group opinions rather than individual communications at the meetings, and about our desire to adventure out of our normal field of work into this wider region, one meets with general approval. It is, however, far from easy in these busy days to get men and women to settle down to serious discussion and to formulate their ideas on paper for the benefit of other people : but this is what we want. Certainly in every academic centre in this country there should be sufficient people with concern for the sanity and balance of society to provide separate discussion groups for each of the five topics ; and, equally, there are many more isolated areas where perhaps the inter-professional nature of the group might be more limited, but yet there are people who could get together and produce much that would be of real value. Careful studies of much more limited subjects coming within the general field of interest of the main topics would also be welcomed. It is hoped that it may be possible to publish, fully or in summarized form, in the documents of the Congress such of them as are specially useful.

I hope that this letter may be taken as an invitation of a somewhat urgent kind to those who feel a concern about these matters to do something, and to get in touch with Prof. Flugel (the chairman of the programme committee) or with the programme secretary at the office of the International Congress on Mental Health, 19, Manchester Street, London W.1.—I am, etc.,

London, W.1. J. R. REES.

The Extent of Neurosis

SIR,—Is not Dr. H. Crichton-Miller's thesis (Oct. 25, p. 669) based on too narrow an interpretation of the facts ? Effort directed against fear—if clearly envisaged—is but one means of giving significance and meaning to activity. I would suggest that this feeling of significance is the more fundamental factor in the apparent cause and effect he postulates.

Evidence in favour of such a view comes from a recent investigation of rate and standard of production in an electrical-instrument works. The story will be known to many of your readers. A group of workers were chosen and their co-operation obtained by explaining the objects of the inquiry. Various changes were then made, one by one, in their working conditions. Lighting was improved, seats were made more comfortable, music was provided, etc. With each change output improved. The dénouement came when conditions were finally put back to where they started—and still output improved ! It was the opinion of those conducting the experiment that the feeling of purposeful co-operation in this group of workers was responsible for the increased work.

I suspect that such a feeling of significant purpose is encouraged in the U.S.S.R., and was inherent in the general "Weltanschauung" of that part of the Victorian era which produced "the finest work in quantity and quality." But to suggest that fear is the only or main source of such a feeling seems to me against the evidence, and an ethically undesirable philosophy.—I am, etc.,

Oxford. C. W. M. WHITTY.

Child-bearing and Tuberculosis

SIR,—Drs. C. J. Stewart and F. A. H. Simmonds are to be congratulated on their valuable paper on child-bearing and pulmonary tuberculosis (Nov. 8, p. 726). There can be little doubt that numerous pregnancies have been needlessly terminated. Diseases such as diabetes and syphilis are established or excluded by laboratory routine in antenatal clinics. A routine chest radiograph is perhaps even more essential than the routine W.R.

Modern tuberculosis therapy offers the greatest help to the pregnant woman who has early pulmonary disease, and there can be little doubt that a chest radiograph should form part of the early antenatal care of every woman.—I am, etc.,

Bournemouth. D. J. AP SIMON.

SIR,—Drs. C. J. Stewart and F. A. H. Simmonds (Nov. 8, p. 726) are to be congratulated on their statistical research into the above question, and their conclusions will be gratefully received by tuberculosis workers throughout the country. Nevertheless it should not be forgotten that tuberculosis workers deal with individuals suffering from tuberculosis, with their families and contacts, and that from the point of view of the treatment of individual cases statistics may be very misleading. It is, for example, quite impossible to show by statistical methods that sanatorium treatment has any influence whatever on the course of pulmonary tuberculosis, yet those of us who have spent a lifetime in dealing with individuals suffering from this disease can recall the names of dozens or hundreds of our patients whose lives have been saved by prolonged sanatorium treatment and who would undoubtedly have succumbed without it. Similarly, while accepting the general conclusions of the Middlesex investigators that, statistically, pregnancy has little or no effect on the progress of pulmonary tuberculosis, we all can recall individual cases in which pregnancy led to disaster.

As a matter of clinical observation and experience the effect of pregnancy on an active case of pulmonary tuberculosis with cavitation and tuberculosis bacilli in the sputum is well recognized. Provided that the patient does not suffer from

hyperemesis gravidarum or other complication, the pulmonary condition usually improves during pregnancy, and this improvement is particularly marked in the later months. Whether this improvement is due to metabolic changes such as increased absorption of calcium, production of calciferol, etc., or can be attributed to some extent to compression of the lungs from below by the rise in the diaphragmatic level, is not known, but there is no doubt of its occurrence.

Then comes parturition and the puerperium, at the end of which in only too many cases one finds that all the progress made during pregnancy is lost and that an acute flare-up of the disease may occur. If we knew the cause of this sudden drop in the patient's resistance we could, perhaps, take appropriate measures. Is it due to obstetric shock, to loss of blood, or to the sudden re-expansion of the lungs with abdominal relaxation? Does it occur in women of primitive races whose delivery is easy? Does it occur after delivery by early caesarean section?

Collapse therapy by artificial pneumothorax when practicable is of course continued during pregnancy and pushed after parturition. But when artificial pneumothorax, although desirable, is impossible, should the induction of pneumoperitoneum, with or without phrenic crush, as soon as practicable after parturition be regarded as the method of election in such cases; or are there special risks attributable to the condition of the pelvic floor, etc., which render this treatment inadvisable? These are some of the questions which call for answers, and until the answers are forthcoming the temptation to terminate pregnancy in women suffering from active and acute pulmonary tuberculosis will remain.—I am, etc.,

Chichester. P. HEFFERNAN.

Heparin for Coronary Thrombosis

SIR,—Lest a massive dose of double strength be given as suggested in Dr. J. T. Maclachlan's letter (Nov. 1, p. 709), with what results I do not know, perhaps the massive dose recommended by Prof. Lambert Rogers in the *Practitioner*, October, 1947, p. 247—viz., 300 mg.—would be safer to give.—I am, etc.,

Worthing, Sussex. R. H. WILSHAW.

SIR,—Dr. J. T. Maclachlan (Nov. 1, p. 709) advocates the use of heparin in cases of coronary thrombosis. On theoretical grounds it would seem that heparin is indicated in the treatment of this condition. On the other hand it would seem important to critically survey any extension of the use of an important therapeutic agent such as heparin before extending its use indiscriminately.

The interest in heparin has been stimulated recently by the classical work of Jorpes and other Swedish workers. It is of interest to note that these workers have confined themselves mainly to the use of heparin in the treatment or prevention of thrombosis arising in the femoral blood vessels following operations, and they have dealt with pulmonary embolism on the grounds that this condition arises as a consequence of undetected femoral-blood-vessel thrombosis. The femoral blood vessels have an elaborate collateral anastomosis, and heparin therapy will keep this collateral anastomosis open until such time as the original clot has become organized or canalized. In Jorpes's work there is no mention of heparin for use in either coronary or cerebral thrombosis, and it would seem that the question of coronary and cerebral thrombosis was shelved because these workers felt that heparin would not prove of much value in these conditions.

So far as coronary thrombosis is concerned I would not use it myself because (1) once a thrombus is formed heparin has no further action and will not dissolve the clot; (2) a large number of cases will die from the shock and spasm attached to the attack of coronary occlusion, and heparin will be of no value, as these cases will die instantaneously; (3) the coronary arteries are end-arteries, and as such there is no collateral circulation to carry on after the attack of thrombosis; and I cannot see how heparin will prevent infarction or ischaemia of the heart muscle leading to ultimate impairment of cardiac output or death from rupture of the heart; (4) it would also seem that if the thrombosis is, as it is so often in coronary thrombosis, secondary to some disease or degeneration of the blood vessel such as arteriosclerosis or atheroma, then as heparin has no curative action upon the condition which is causing the thrombosis we must not expect too much from heparin therapy. I am putting these points forward not in order to air my own views but in the hope that some cardiologist will clear up the doubts in my mind. It would be a pity if a therapeutic agent such as heparin, which has been proved to be of value in certain specific conditions, should fall into disrepute because it has been used in conditions in which its use is unsuitable.—I am, etc.,

Southport, Lancs. JOHN H. HANNAN.

SIR,—In his letter advocating heparin therapy for cases of coronary thrombosis Dr. John T. Maclachlan (Nov. 1, p. 709) suggests that it should be given after shock has been treated with morphine. He does not indicate clearly what delay there should be before using heparin. Unless someone can show any contraindications I would suggest that it be commenced as soon as possible after the attack. Pollard and I (*Quart. J. exp. Physiol.*, 1946, **33**, 267) produced evidence that heparin, physiologically, does not appear to be a blood anticoagulant. It is stored in the tissues and only enters the blood as a result of trauma. The amounts released, as a result of trauma, are hardly enough to warrant its being called an anticoagulant. In fact, as normal clotting time lengthens, the action of heparin in physiological doses is to reduce it. We feel that heparin takes part in the "adaptation syndrome" described by Selye and almost certainly plays a defensive role in the body. The nature of its action is not yet understood, but its chemical character suggests that it will be an antibody to a number of substances which occur in the body, an example being histamine.

On the hypothesis that certain aspects of shock might be due to the action or overaction of histamine or similar substances, we tried heparin as follows. A female aged 72 years had been almost totally burned. When seen three hours after the accident she was very cyanosed. During 10 minutes 70 mg. of heparin was given. The cyanosis disappeared. A further 70 mg. was given by drip during the next 1½ hours. After another hour, during which no heparin was used, the patient developed acute pulmonary oedema. 75 mg. of heparin apparently completely relieved the condition. On two more occasions before the patient died (6 hours later) the pulmonary oedema returned and was similarly relieved by heparin. Heparin supplies were limited and this prevented more continuous administration.

We have seen several cases of migraine and a case of asthma quickly relieved by a skin prick, which would produce a natural outflow of heparin into the blood. It is likely, though not proved, that adrenaline is the chemical mediator by which heparin is discharged from the tissues into the blood. When its real action is understood, it is probable that heparin will find a useful place in therapy other than as an anticoagulant. Knowledge of this action will be gained more rapidly if clinicians are alert to its possibilities.—I am, etc.,

Ossett, Yorks. S. B. STOKER.

Health Regulations for Air Travel

SIR,—At the present time, with a continually increasing volume of air travel, any measures directed to the prevention—as far as possible—of the introduction of disease into this country by air-borne passengers is bound to be of interest. Dr. R. H. Barrett's article (Nov. 8, p. 741) gives a résumé of the regulations approved by the International Convention for Aerial Navigation, 1944. These regulations show clearly the amount of thought and planning (blessed word!) which has been devoted to the subject. Planning, unfortunately, is not infallible.

That there is a very real danger of the introduction of infectious disease by air which might be the starting-point of an epidemic cannot be denied. "We have reached the stage when we no longer think of countries overseas as being separated by distance, but by time. . . . That is to say that countries where all sorts of unfamiliar diseases flourish are nearer to this country in point of time than the length of their incubation periods" (Presidential Address, Surrey Branch B.M.A., July 2, 1947).

Compliance with the regulations in every particular may absolve the various airways corporations from charges of carelessness or neglect when supported by all the necessary certificates required by the regulations, but nobody could possibly claim that they are an absolute preventive. Only quarantine can do that. To insist on quarantine in the case of every passenger is manifestly unnecessary and impracticable. It was to avoid delay and inconvenience to travellers by sea that the system of sanitary surveillance was adopted by the Paris Convention, and on the whole it has worked well. It must not be forgotten that in travelling by sea infectious disease may reveal itself in the course of the voyage. Travel by air, by reason of its speed, is deprived of that natural safeguard to a very great extent.

To conform to the different conditions as far as possible, recourse is recommended to preventive inoculation by the Air Convention. As we know from past experience, inoculation is by no means an absolute preventive. It may, in fact, modify diseases to a subclinical and much less easily recognized type, in which the sufferer is just as much a possible source of infection. Moreover, non-carriers may be converted to carriers. This appears to have been foreseen to some extent by the adoption of a form of sanitary surveillance (*vide* "Health Regulations for Entry into the United Kingdom") and the "warning card" to be given to the patient's doctor. This measure is by no means foolproof. Pressure of business and shortness of sojourn are apt to cause the patient to "fight the disease" so that he may be able to get through his work in the time at his disposal. He may try to rationalize his symptoms as "another go of my old dysentery (or malaria)" until it lays him low and he has to call in a doctor, by which time he will probably have spread infection. His doctor may be unfamiliar with tropical diseases and inclined to accept the patient's own diagnosis until the illness takes a more serious turn.

I do not think too much value should be given to "personal declarations of health" for the same reason. It has not been unknown in the past for an individual to make a false statement for reasons of expediency to avoid being held up. Persons who make false statements or fail to comply with instructions may be a great menace, and if detected should be liable to heavy penalties. It would be a sound step if every airport which receives aircraft from overseas had provision for the temporary reception and rapid diagnosis in cases of illness in persons "deplaning." This should have facilities for blood and stool examinations on the spot, and the airport medical officer should be a man with considerable tropical experience. Such provision is a matter for each country to make the arrangements which it considers to be most efficient. It is not uncommon to find that persons who have lived in hot countries are carriers of typhoid or dysentery. I have seen a perfectly fit and healthy person who, in the course of a routine examination, was proved to be a cholera carrier. These are risks that have to be taken.

It would be too much to hope that we may continue to escape from air-borne infection indefinitely. Hence the importance of adequate provision for isolation and rapid diagnosis.

I wonder who invented the horrible words "disinsectization" and "disinsection"? Would not "disinfestation" have served the purpose?—I am, etc.,

Brookwood, Surrey. H. M. STANLEY TURNER.

Appendicitis in the Young Child

SIR,—Dr. Howard Williams is to be congratulated on his paper (Nov. 8, p. 730) on the above subject. There is, however, a point in differential diagnosis which appears to me to need stressing and which I have not seen pointed out before. It is the inverted respiration (inspiration—pause—expiration—immediate inspiration) which is often found with the onset of peritoneal involvement. This is usually looked upon as a sign of intrathoracic disease and is especially misleading, as some 20% of cases of acute appendicitis in children are associated with or immediately follow upon an upper respiratory infection. The mechanism is the same whether the chest or the abdomen is involved; the breath is held in inspiration in the one case because of the pain of pleural involvement, in the other case because of the pain of peritoneal involvement, and the association of inverted respiration with the latter infection is particularly noticeable in childhood, where diaphragmatic respiration is naturally greater than costal respiration. Movements of the alae nasi are frequently present with the altered respiratory rhythm.

The correct diagnosis depends on the definite finding of focal abdominal tenderness or rigidity. This can be confirmed in cases of serious doubt by aspiration of the peritoneal cavity, a method I have never used but have seen employed in the U.S.A. with satisfactory results. The normal cell content is about 2,300 per c.mm., and is mainly composed of mononuclears and lymphocytes. The pulse, respiration rate, temperature, and lymphocyte count are of little value, and *x*-ray films both of the chest and of the abdomen may be misleading.—I am, etc.,

Sheffield. JUDSON T. CHESTERMAN.

Anaesthesia for Head and Neck Surgery

SIR,—The flexible metal tube with mouthpiece described by Dr. J. G. Bourne (Oct. 25, p. 654) is an interesting piece of equipment. For some time an ordinary Hewitt's airway has been used in the same manner with good results. The fixed curve of this airway holds the tube so as to prevent deviation towards the oesophagus; it obviates the use of introducers, as does the curve given to the tube by storage in a circular tin. When large tubes are in use the airway required takes up a good deal of space, and there may be some difficulty in sliding it along the blade of the laryngoscope even if the Macintosh spatula is in use. Dr. Bourne's tube should be an advantage in these cases.

The use of "tubarine" for intubating cases of head and neck surgery is perhaps debatable, as a suitable dose of thiopentone given slowly, followed by nitrous oxide with a little trilene or ether by passive ventilation, has been found to facilitate laryngoscopy and intubation. The same mixture is used for maintenance, and local analgesia of larynx and trachea is not required. It is felt that this sequence, using only a small amount of volatile anaesthetic, is less depressing than curarization; admittedly it takes more time.—I am, etc.,

Glasgow. C. T. BARRY.

Control and Treatment of Diphtheria

MONSIEUR,—Je viens de lire avec un vif interêt votre "leading article" du *Journal* de March 22 (p. 384) ainsi que la suggestive étude de Dr. James Fanning (p. 371). Cette lecture me suggère les réflexions suivantes.

D'après Collins, 7% seulement des enfants non soumis à l'immunisation contractent la diphtérie au cours des 15 premières années de la vie. Pour que l'immunisation soit efficace, elle devrait donc protéger plus de 93% des enfants inoculés au toxoid. Or, comme je l'ai montré dans un article—"Fréquence de la Diphtérie chez l'Enfant dans ses Rapports avec la Vaccination"—le pourcentage des Schick-négatives par l'immunisation active ne dépasse pas 85 à 90% (Ramon). La vaccination au toxoid ne peut donc pas être efficace.

Vous dites qu'en 1947 en Angleterre 50 à 60% seulement des enfants sont inoculés. En 1941 cette proportion était forcément beaucoup plus faible et ne peut pas expliquer la baisse qui a commencé à ce moment. Tous les partisans de la vaccination antidiphtérique (Goldfley, Ramon, etc.) sont, en effet, d'accord pour dire que l'immunisation ne commence à produire ses effets que lorsque 40 à 50% au moins de la population infantile est immunisée. Si la diphtérie a beaucoup diminué en Angleterre depuis cinq à six ans, elle a diminué dans de bien plus grandes proportions *dans des pays où l'on n'a pas vacciné.* En Suède, par exemple, de 1919 à 1938 le nombre des cas a passé de 40,514 à 113 et celui des décès de 2,000 à 10.

Vous estimez que le renouvellement des injections de toxoid rendrait l'immunisation plus efficace. L'expérience prouve qu'il n'en est rien (voir mon étude, "La Multiplication des Injections de Rappel Rendrait-elle Efficace la Vaccination Antidiphtérique?"). Veuillez agréer, mon cher Confrère, l'expression de mes sentiments les plus distingués.

Lyon, France. ROBERT RENDU.

A Method of Abdominal Palpation

SIR,—I was interested to read Dr. E. W. Price's article (Nov. 1, p. 703) describing his method of inducing relaxation of the abdominal wall, which seems ideally suited to ambulant patients or those already in the erect posture. In this country most patients are already supine at the time of examination, and time would be wasted in getting them up, just as with Dr. Price's ambulant African cases time would be wasted by getting them to lie down.

I have for some years used the following simple means of inducing relaxation in supine patients who, through nervousness

or anticipation of pain, cannot or will not relax, and which has not been, so far as I am aware, described in textbooks or taught in medical schools. The patient is asked to press his head hard back into the pillow. This simple action contracts the erector spinae, and in 19 cases out of 20 the abdominal muscles, which are antagonistic, promptly relax. Moreover, this draws the attention of the patient away from the part to be examined, and a gentle "patter" of conversation on the part of the doctor keeps it away. The principle of contracting a group of muscles in order to relax an antagonistic group is probably also the basis of Dr. Price's method.—I am, etc.,

London, S.E.5. BERNARD J. FREEDMAN.

"Unjustified" Use of d-Tubocurarine Chloride

SIR,—Dr. T. Cecil Gray (Nov. 8, p. 745) has drawn attention to what he describes as the "unjustified" use of *d*-tubocurarine chloride during anaesthesia for operations upon the head and neck. While agreeing with Dr. Gray in this respect I wonder whether he has not fallen into a similar fault in advocating the use of *d*-tubocurarine chloride in caesarean section—a procedure which he describes so ably in your issue of April 5 (p. 444).

To my mind the only possible reason for administering curare preparations to caesarean sections must be for its effect in relaxing the tone of the abdominal musculature, but surely this is quite unnecessary "since the muscles have been well stretched during pregnancy" (H. E. G. Boyle and C. L. Hewer, *J. Obstet. Gynaec. Brit. Emp.*, 1924, **31**, 264). This relaxation can be observed quite easily when the obstetrician sews up the peritoneum, which latter can be lifted some inches above the level of the wound.

The increase in uterine tone observed in Dr. Gray's cases is almost certainly due to his use of thiopentone, "kemithal," or *light* cyclopropane, either alone or in combination, as can readily be demonstrated by omitting the administration of curare. Thiopentone and *light* levels of cyclopropane anaesthesia increase the contractility of the uterus, and since 1943, when we finally recognized this effect at King's College Hospital, the routine use of "pituitrin" has been abandoned after the employment of these anaesthetics. The first caesarean section ever to be performed under kemithal anaesthesia was at the same hospital, and the surgeon was Mr. John H. Peel; the date was Nov. 23, 1944, and in that and succeeding cases we rapidly came to recognize that this drug too had a similar tonic action on uterine muscle.

Apropos of the above, I well remember the first time I administered a *light* cyclopropane anaesthetic for a caesarean section performed by the present P.R.C.O.G. Up to that time it had been his routine to inject pituitrin into the wall of the uterus just before making the uterine incision. On this occasion he persisted with the usual routine, but as his scalpel pierced the uterine wall the surgeon was hit smartly in the face by a geyser of liquor amnii and momentarily incommoded. Such an exhibition had never occurred while using gas–oxygen–ether and was the first of many instances (such as those attributed by Dr. Gray to the employment of *d*-tubocurarine chloride) which made us conclude that these three anaesthetics were uterine stimulants. Incidentally this property makes them useless for intrauterine manipulations or external version, although *deep* cyclopropane anaesthesia (which would never be used during caesarean section) does relax the uterus.—I am, etc.,

King's College Hospital. A. H. GALLEY.

Waiting for Operation

SIR,—A. B. is referred by his medical attendant to a particular consultant at hospital. A diagnosis of early carcinoma of the stomach is made and confirmed. The patient is advised to have an operation, to which he agrees, and he is put on the waiting-list for admission. Presumably the consultant has entered into a contract with the patient and his doctor to carry out the treatment. The patient is not admitted for six or even twelve months, and the growth becomes inoperable.

Is this the responsibility of the consultant or the committee of management of the hospital? Should the law decree that the onus is on the committee of management, is it not incumbent upon the committee to review the number of patients on their waiting-list and to advertise or otherwise make known to all concerned what prospects they envisage of fulfilling the contracts to which they are party? Your decision on these questions is a matter of national importance.—I am, etc.,

London, W.1. HAMILTON BAILEY.

*** Our Legal Correspondent writes: Any cause of action must be founded either on contract (agreement between the parties) or tort (civil wrong; in this case failure to use proper care). In each case the burden of proof is upon the patient. To succeed in an action for breach of contract he must show that an agreement, express or implied, existed to admit him to hospital or to operate on him, or both, while the growth was still operable. If he contracted for operation with the consultant, or for admission with the hospital, on this understanding and could prove it, he might have a chance of success. It is, however, hardly conceivable that either a consultant or a hospital would undertake such an obligation in these days of shortage of beds and would fail to tell the patient that he must wait his turn. Neither the consultant nor the hospital is required to do the impossible. If the patient seeks to found his action in tort, he must prove that the consultant or the hospital, or both, failed to use reasonable care. He might succeed if he could show that it would have been reasonable to warn him of probable delay and that he had not been warned, or that he had been wrongly deprived of his turn in the list, or if there was some other circumstance indicating negligence. Otherwise he would have no chance of success at law; and it may be said generally that in order to succeed he would have to prove a very exceptional state of facts. If he did succeed against the hospital, the committee would certainly be wise to make sure in future that they could not be taken to promise anything they could not perform regarding the interval of time between the acceptance of a patient and his admittance. —ED., *B.M.J.*

Morphine in a Patent Medicine

SIR,—In a medico-legal note (Sept. 27, p. 511) you referred to a case of death in a small child after drinking a quantity of a patent medicine sold for the purpose of relieving infantile disorders. You gave the quantity of morphine in the bottle but stated that it was not disclosed how this figure was ascertained. Actually, the Manchester City Analyst gave the quantity as a result of his analysis, and gave his evidence on oath at the inquest.—I am, etc.,

STANLEY HODGSON,
Salford, 7. Deputy Coroner, Manchester.

SIR,—Dr. Paul B. Woolley (Nov. 8, p. 747), in quoting *The Chemist and Druggist Year Book* as his authority on dangerous drugs legislation, appears to have misinterpreted the paragraph he cites. Paragraph *e* (p. 339) (so far as it affects morphine) states that *any* solution or dilution of morphine in an inert substance is subject to the Dangerous Drugs Regulations; other preparations of morphine—i.e., preparations which are not solutions or dilutions in an inert substance—are subject to the Regulations if they contain not less than 0.2% of morphine.—I am, etc.,

London, W.C.2. O. F. C. BROMFIELD.

Vaginal Temperature

SIR,—Dr. John Hankinson (Oct. 11, p. 574) has drawn attention to the dangers which may accompany the taking of vaginal temperatures. A further similar case has within the last few days come under my care in which a woman had accidentally introduced a clinical thermometer into the bladder. She had been practising this procedure for some twelve months, not for the purpose of birth control, but in an endeavour to become pregnant. No trouble had previously been experienced until one morning she failed to find the thermometer and concluded it had been mislaid in the bedclothes. About midday, however, she experienced a sharp pain in the lower abdomen and some dysuria. It then became apparent where the thermometer was, and she sought medical advice.

An *x*-ray examination confirmed the presence of an intact thermometer in the pelvis, and the passage of a sound revealed the foreign body in the bladder. After preliminary dilatation of

the urethra a pair of narrow-bladed forceps was passed into the bladder, the thermometer lightly gripped and, with the aid of a guiding finger in the vagina, easily withdrawn. A cystoscope was then introduced, and apart from some bruising of the trigone the bladder was seen to be intact. The occurrence of a second example serves further to emphasize the risks inherent in this undesirable procedure, and it seems that patients who follow this practice should be warned of its dangers.—I am, etc.,

Hove, Sussex. W. R. Forrester-Wood.

Sir,—The rectal (or vaginal) method of obtaining the basal temperature gives a more accurate record than the oral. To condemn the method because one woman has accidentally inserted the thermometer into the bladder is as unreasonable as it would be to disallow the practice of self-administration of an enema, when necessary, in case the nozzle was passed into the wrong passage. Dr. G. I. M. Swyer (Oct. 25, p. 672) would do well to read an article by Dr. Hales (*Medical Press and Circular*, May, 1946) in which he gives charts of a number of chronic diseases in which the condition would have been overlooked had reliance been placed on the oral recording. I know of an instance in which absence of the ordinary biphasic temperature record of the menstrual cycle drew attention to a tuberculous endometritis. The patient was warded for investigation, and it was observed that the temperature taken by the oral route failed to show the persistent slight rise shown by the rectal method.

The rectal route gives a more accurate degree of temperature. There are a few women whose records of the basal temperature in the pre- and post-ovulatory phase show only a slight difference in the fluctuations, the biphasic character of which could easily be missed if recorded by the less sensitive oral route.—I am, etc.,

London, W.1. M. Moore White.

Health Visitors

Sir,—The existing shortage may be attributed to a combination of causes: (*a*) greater demand on a reduced supply; (*b*) long course in training—as a nurse, midwife, and health visitor's certificate; (*c*) less call for change of area from stabilization of pay; (*d*) multiplicity of duties; (*e*) interference with training during the war. Two questions arise in one's mind to meet the existing demand: (1) Should a special interim short-term policy of a shorter course, or only a health-visitor's certificate course, be carried out? (2) Should only a long-term policy of existing methods of training prevail even at the expense of acute shortage for years—it may be five to ten years before normality reigns?

At the present time there is no doubt that considerable economy could be carried out in the use of health visitors and that in this respect either (or both) an assistant nurse or a voluntary worker could be utilized in the place of some of the duties now carried out by health visitors. Locally lady members of the maternity and child-welfare committee (both councillors and co-opted members) take turns of duty on a rota at my infant-welfare clinics. No *trained* nurse is required at an immunization clinic, at weighing of infants and toddlers, the recording of such, and the distribution of foodstuffs. With a doctor in attendance at infant-welfare clinics it should be possible with lectures on hygiene and baby welfare to release some trained nurses for hospitals, where the claim of the sick should hold priority for their services.

There are also some new fields now being attempted for utilization of the services of health visitors. I refer to immunization and blood withdrawal for Rh factor. A hypodermic injection is one thing, but an intramuscular injection of an antigen (capable sometimes of producing shock) and the introduction of a needle into a vein (not always at first shot) are quite different and definitely surgical procedures. In the latter of these unless great care is exercised in asepsis and method there can be a cause for toxaemia. Again this Rh factor concerns midwifery and the midwife at the antenatal clinic is more concerned with the result than the health visitor, and so surely the midwife should be trained to do this at the clinic. One has recently had judgments against a hospital in connexion with a certain case, and it behoves us to defend our authority to the best of our judgment. On these thoughts I should like to have views of others, and perhaps we may get a lead from the Ministry on some of the problems raised.—I am, etc.,

Blyth, Northumberland. A. G. Newell.

Penile Carcinoma

Sir,—An experiment conducted on a national scale for two thousand years has proved that penile carcinoma is preventable by circumcision, and King Edward's question about tubercle, "If preventable, why not prevented?" is relevant to this form of cancer. As the writer of the annotation (Nov. 1, p. 699) observes, carcinoma of the penis is a rare disease. From a selfish point of view men need not trouble themselves about it unduly, but the interests of the other sex are involved. Correlated with the absolute freedom of Jewish men from this form of cancer is the relative freedom of Jewish women from carcinoma of the cervix. In New York, where three million of the eight million inhabitants are Jews, Dr. Maurice Lenz states that not 1% of the cases of cancer of the cervix occur in Jewish women. During a short visit to the Fiji Islands, where circumcised Fijians live alongside uncircumcised Indians, I obtained statistical evidence that cervical carcinoma is rare in the Fijian women but relatively common in the Indian women, no doubt from a transference to the vagina of the mixed bacterial flora that flourish beneath the prepuce.

As your annotation states, it is unlikely that the routine circumcision of male infants would commend itself to English opinion. But a simpler operation—slitting up the prepuce in the dorsal midline—would be equally effective, and in the first few days of life can be done without an anaesthetic. Only for a long phimotic prepuce is circumcision necessary.

The evidence indicates that routine preputiotomy for male infants would abolish penile cancer and ultimately reduce the incidence of carcinoma of the cervix in this country from about 4,000 cases per annum to 500 cases per annum. The principal obstacle to its adoption appears to be the erroneous belief that carcinoma of the cervix is the result of tearing of the cervix during parturition—an accident to which women of all races are equally liable.—I am, etc.,

London, W.1. W. Sampson Handley.

Modern Treatment of Neurosyphilis

Sir,—I was most interested to read of the experiences of Drs. F. Graham Lescher and H. R. M. Richards in their article "The Modern Treatment of Neurosyphilis" (Oct. 11, p. 565). I note that their most successful results were obtained with combined penicillin and malarial therapy. The following two cases which I treated in conjunction with Sir Sidney Sewell early last year may therefore be of interest.

Case 1.—Mrs. B., a woman of 36, was found to have a positive Wassermann reaction when her husband developed neurosyphilis. She had no clinical symptoms or signs of disease, but the Wassermann and Kline reactions were positive +++ in both blood and cerebrospinal fluid, and the C.S.F. cell count was 40 lymphocytes. Prior to my seeing her she had had three courses of intravenous arsenic and intramuscular bismuth and one seven-day course of penicillin, 15,000 units three-hourly. Following the first course of penicillin the Wassermann reaction of her blood had been negative, but this had reverted to positive when I saw her, and the C.S.F. findings were as above.

She was put into hospital and given penicillin, 20,000 units three-hourly for ten days, and for the last seven days 5,000 units was given intrathecally twice daily. A month later the Wassermann reaction was negative in the blood but still positive in C.S.F. A further month later the blood Wassermann was positive +, and after another month positive ++.

She was then subjected to hyperthermia in the inductotherm to 105° F. (40.6° C.) for six hours, with two doses of penicillin, 50,000 units (the first at the commencement and the second three hours later) given intramuscularly. In all she was given twelve treatments at weekly intervals.

A month after cessation of treatment Wassermann reaction was negative in both blood and cerebrospinal fluid and has remained so with monthly blood and quarterly C.S.F. Wassermann tests since then—a period of eighteen months. Apart from one occasion (the fourth treatment) when she developed hyperpyrexia which responded to the usual measures, she tolerated the treatments well.

Case 2.—Mr. D., aged 42 years, was a tabetic. He originally had presented with gastric crises three years before. When I saw him for the first time he had been under continuous treatment with arsenicals, bismuth, mercury, and iodides for three years. He complained of intractable lightning pains and frequent severe gastric crises and was in danger of becoming a morphinomaniac. Wassermann reaction was positive +++ in blood and C.S.F.

He was treated by twelve inductotherm fevers combined with penicillin as in Case 1, and a month after cessation of treatment Wassermann reaction was negative in blood and C.S.F. Repeated tests for the past year have remained negative. Lightning pains disappeared after the fifth treatment and have not recurred, and there have been no further gastric crises. At the commencement of treatment both ankle jerks were absent ; they are now present, though diminished as compared with a normal individual. He tolerated treatment well and was able to carry on his business in between treatments.

I have not had the opportunity of treating any further cases along these lines, but it seems to me that the inductotherm is to be preferred to malarial therapy. With skilled attendants the risks are slight and certainly no greater than those with malarial therapy. Where anaesthetic areas are present, especially over the heels or coccygeal region, burns are a very real risk, and the state of the pain fibres in these segments should be carefully tested before commencing treatment. The risk of hyperpyrexia can be minimized by skilled and experienced attendants. It is a very frightening complication, but prompt treatment should prevent fatalities. Using treatment at weekly intervals the patient's daily life is not unduly upset, and he can usually continue with his occupation, attending for treatment as an out-patient—a very important matter in these days of shortage of hospital beds.

Stratton St. Margaret, Wilts. SIDNEY A. SEWELL.

Duodenal Ulcer and Priority Foods

SIR,—Dr. A. H. Morley's statement (Nov. 8, p. 745) that the symptoms of chronic duodenal ulcer are here to-day and gone to-morrow only to return another day, and that two pints of priority milk daily for these patients is squandermania, should not go unchallenged. The symptoms of chronic duodenal ulcer are chronic, recurring at regular intervals every day and every night throughout many years. Patients suffering from this disease have to learn and apply a strict and rigid regime of diet and conduct if they wish to avoid the symptoms of pain, vomiting, acid regurgitations, laryngeal spasms. Alkaline powders are often useless and even harmful. Small amounts of milk at frequent intervals is the best method of counteracting the hyperchlorhydria, and two pints a day is not over-generous. If any alternative to present certification were contemplated it should be to extend the period covered by the certificate to six or twelve months.—I am., etc.,

Harrold, Beds. R. STUART.

Milk for the Sick

SIR,—I feel that the following account of a recent and, presumably, continuing struggle with the food authorities may be of interest. The relentless undermining of the doctor–patient relationship is once more demonstrated and made very clear, and it is possible that ventilation of the story may be of help to someone in a similar predicament in the future.

Miss X. is a panel patient aged 54. She has a permanent gastrostomy necessitated by inoperable carcinoma of the oesophagus. Until a fortnight ago she required and obtained a special milk ration of 3½ pints (2 l.) per day. Two weeks ago this was without warning cut to 1½ pints (850 ml.) per day, but as a result of my intervention at the food office and at the cost of a wasted morning it was restored pending the consideration by the medical advisers of a "confidential" report from me.

Yesterday the ration was again cut without warning to my patient or myself to 2 pints (1.1. l.) daily, an allowance on which she will quickly starve. I visited the food office at once and was shown a letter which simply states that "Our advisers recommend that the patient be granted two pints of milk daily and a priority allowance of eggs for three months renewable . . . but they cannot recommend any supplies in excess of the allowance, and the request for five pints of milk must be refused." This last request had not of course been made. The medical advisers had made no inquiries further to my original letter, nor of course had they or anyone else seen the patient. It would appear possible that these gentlemen are somewhat out of touch with the problems of management of gastrostomies in general practice.

At this stage, in an attempt to save my patient's life, I sought the help of the Association, and a very helpful secretary put me in touch with a charming gentleman at the Ministry of Food. To him, not a medical man, I was compelled by circumstances to disclose the patient's name and address. The diagnosis he already had, so the breach of professional confidence was complete. He told me that he would make an immediate authorization as a "life-saving measure" while the matter was referred to these mysterious advisers. When I told him that they had already decided, he rescinded his decision, but when I further reminded him that the phrase "life-saving measure" was his own he changed his mind again, and the issue is now, as far as I know, again authorized pending some undefined further decision.

It does seem intolerable that when these "advisers" decide against an application on behalf of a patient that they have never seen action can be taken to implement their decision without further reference to the doctor concerned, that one should have to disclose confidential details to a completely unknown layman, and incidentally that one should have to spend a sum considerably greater than even the new capitation fee on telephone calls to obtain the bare necessities of life for a desperately ill patient. And it would appear to bode ill for anyone rash enough to suffer from this complaint after July 1, 1948.—I am, etc.,

Gt. Yarmouth. H. DE B. MILNE.

Homosexuals

SIR,—May a schoolmaster with some knowledge of history be permitted to comment on the concluding paragraph of Mr. D. Stanley-Jones's letter (Oct. 25, p. 671) ? It is difficult to recognize in his description of Innocent III as "a repressed homosexual and a fanatical persecutor" the subject of Prof. E. F. Jacob's brilliant opening essay in the sixth volume of the *Cambridge Mediaeval History*. Mr. Stanley-Jones's conviction that the Albigensians and Bogomils were engaged solely in a quarrel with the Church of Rome looks odd after reading, for instance, the views of a scholar of international repute such as Prof. Jean Guiraud, a useful summary of which may be found in the third volume of *European Civilization* (Oxford University Press, 1935).—I am, etc.,

York. T. CHARLES-EDWARDS.

Refraction Testing

SIR,—It is a strange suggestion that a medical man should be invited to prescribe spectacles for a visual disability if he lacks adequate specialist knowledge to investigate other possible causes, or that, being recognized to possess such knowledge, he should abstain from applying it. These are the only logical interpretations to be placed upon the recommendation of a lesser sessional rate of remuneration for "clinical refraction work" than for specialist examination, and for countenancing the evasion by local education authorities of liability in respect of children attending a hospital eye department "solely for the prescription of spectacles." The estimate of error of refraction and of the possible benefit to be conferred by spectacles is but a part of ophthalmic specialist examination ; the desire of the patient or of others to elicit a prescription for glasses cannot absolve a doctor of responsibility to apply special medical knowledge of eye conditions or warrant a cheap or gratuitous "semi-specialist" service.

A patient consults a doctor for his opinion and advice, and although this may be expressed in relation to pharmaceutical means the attendance is not "solely for the prescription of a bottle of medicine." The representatives of the profession cannot recognize any such suggestion of limited application of the skill of its members, bearing the implication of a "dual standard" or worse. It is legitimate to establish certain qualifications of experience and training to merit recognition in special fields ; it is paradoxical to suggest that the eyes of each school

child need specialist ophthalmic care, and yet to approve a less-than-specialist rate of remuneration for "clinical refraction" (whatever that may mean) as something apart from specialist ophthalmic examination. As a part of such examination the specialist may—and in the future will—delegate it to others adequately trained in that routine procedure, and correlate their findings with his in determining further conduct, including the prescription of spectacles if indicated. In a special matter affecting so important an organ no doctor can feel happy in advising the use of an appliance without specialist opinion of its suitability.

From recent correspondence in these columns on the subject of amblyopia, however, it seems that a few doctors are insufficiently aware that squint in children seldom arises from error of refraction alone; that in its inception there are commonly paretic and other factors, sometimes transient but often persistent; that attempted cure by spectacles, however apt, will fail in a large number of cases; and that by delay in examination or by misplaced confidence in spectacles alone opportunity may be irrevocably lost at an important period in visual development, especially in infancy and the pre-school years.—I am, etc.,

Hull. D. STENHOUSE STEWART.

Contact Lenses

SIR,—I think that it is right to point out that the remarks of Mr. A. Seymour Philps (Sept. 20, p. 469), based on the experience of a number of patients, present a more correct estimation of the results of wearing contact lenses than do those of Dr. C. Peter Warren (Oct. 11, p. 589), derived from his personal experience, satisfactory as that may be. A survey of a large number of patients who have been fitted with contact lenses has recently been carried out, and the results, which will be published in full elsewhere, show that about one-third of all patients fitted no longer wear their lenses. The careful preliminary estimation of each patient's suitability for contact lenses is essential to reduce the percentage of disappointments.—I am, etc.,

London, W.1. A. G. CROSS.

Planning and World Population

SIR,—I have always found it difficult to understand why such people as Dr. G. E. Paul (Oct. 11, p. 589) put man's sexual functions in a category entirely apart, when to the average person they would seem no more important than the functions of self-preservation and nutrition, for instance. Surely it would be equally logical for Dr. Paul to state that one of man's functions made known to him by his reason is self-preservation, and two of the organs most involved are the eyes, so that any act where they are used exclusively for pleasure, such as reading a good book or visiting the theatre, is intrinsically evil, because self-preservation is temporarily ignored. Using a similar argument, eating or drinking substances which give pleasure, but do not nourish and so temporarily frustrate the true purpose of the digestive glands, becomes intrinsically evil also.

Perhaps those who hold the same views as Dr. Paul perform no action which does not fulfil a basic function. If so, I admire their intensity of purpose; the world would undoubtedly be a better place if there were more like them, but I doubt if it would be happier.—I am, etc.,

Islip, Oxford. J. L. BOLDERO.

Student Health

SIR,—Your readers may be aware that the British Medical Students' Association has been discussing the problem of student health for the past two years. At the last Annual General Meeting in London the following resolutions were made:

That the B.M.S.A., taking into account the hazards to which clinical students are exposed and bearing in mind the facilities which already exist in all teaching hospitals, views with concern the absence of any compulsory medical examination for clinical students on admission to hospital. The B.M.S.A., therefore, recommends very strongly that all schools which have not already done so should with the least possible delay arrange regular compulsory medical examinations for all their clinical students.

That the B.M.S.A. recommends that every University should appoint a full-time medical officer who, together with such assistance as may be necessary, should be responsible for the routine compulsory medical examination of all matriculated students with the dual object of raising the standard of student health by giving advice and of obtaining information about the student morbidity rate and its relationship to the varying factors in university life.

Compulsion was agreed on after considerable discussion because the delegates from all over the country realized that voluntary student health schemes, where they existed, have left a good deal to be desired. It must be further pointed out that entrance to university will in no way be influenced by medical examination, as this will take place after students have already matriculated. It is hoped that the first resolution will be acceptable to many schools in the very near future. The second resolution will be sent on to the National Union of Students and the Scottish Union of Students with the hope of formulating a united student policy on this important problem.—I am, etc.,

Edinburgh. S. M. DRANCZ, President, B.M.S.A.

Road Accidents

SIR,—The paper by Dr. Kenneth Soddy (Oct. 18, p. 623) on the psychological aspects of accidents is interesting and no doubt scientifically valuable, but it appears to me somewhat remote from the immediate problem. I have before me a newspaper cutting of to-day's date of police court proceedings in which a driver was fined £5 and his licence not suspended following an accident in which a pedestrian was run down on a crossing and his body thrown 20 ft. Independent evidence was given that the crossing was clearly visible, and a bus driver estimated the speed of the car at between 35 and 40 m.p.h. in a busy street.

The truth is that nearly everybody in authority is a motorist, including magistrates, and the law in consequence is not adequately enforced. Motorists have got into the habit of throwing the onus of avoiding accidents upon the hapless pedestrian, including the young and the aged, who are the chief victims, instead of constantly bearing in mind that they are in charge of a potentially dangerous machine that it is their responsibility to keep well under control. The short-term solution is low speed and strict law enforcement under the present-day conditions of mixed traffic. The long-ferm solution is segregation. This is the policy of this association.—I am, etc.,

London, S.E.24. T. C. FOLEY, Secretary, The Pedestrians' Association.

Future of Almoners

SIR,—Next year the financial functions of hospital almoners will come to an end. It is to be hoped that they will then be able to devote more time to the needs of long-term patients, sometimes known as the "chronic sick." Such cases often require considerable help to adjust their circumstances to the conditions arising from their illness when this lasts months or years, not weeks. Payment for tenancy of rooms may need settlement; business affairs often require some attention; legal advice may be necessary. None of these matters can be conveniently managed from a hospital bed. In these days, when some hitherto incurable disease can be treated with a certain amount of success, it may be necessary to find a home or lodging for the patient on discharge. At present the "acute" short-term case has almost monopolized the attention of the almoners.

After they have been parted from their money bags they will need to spend more time with the long-term sick; for only by assisting in the rehabilitation of the despised "chronic" will they be able to play their part in relieving the congestion in hospital beds which now so sorely afflicts this country.—I am, etc.,

London, S.W.11. TREVOR H. HOWELL.

Qualifications and Remuneration of Specialists

SIR,—It would appear self-evident that the appropriate qualification for a psychiatrist is a qualification in his own specialty. Certainly his study of psychiatry should be founded upon a sound knowledge of general medicine. Perhaps the standard of the D.P.M. has not always been consistently high, but are these good reasons for taking the M.R.C.P.? Experience has shown that a high proportion of the psychiatrists

who take the M.R.C.P. become interested in the physical aspects of mental illness to the exclusion of the psychological side. To hold the higher qualification essential to the general physician is surely not the hallmark of the psychiatrist. It merely proves he has spent a period of study (probably two years or more) away from his own specialty.

A sound knowledge of general medicine is equally essential for any other specialist. Are surgeons or gynaecologists to take the M.R.C.P.? I submit that academic distinction is only one of the qualifications of a specialist. Experience and ability are equally important.

Those who advocate varying scales of remuneration for specialists in different branches of medicine advance all manner of "reasons" for this. The two favourite arguments are (1) responsibility and (2) alleged amount of work done as assessed by annual turnover of patients. Anyone who has practised psychiatry in a busy observation ward will agree that the responsibility is great. Decisions affecting the liberty of the subject are part of the daily routine. Decisions involving the safety of the general public are frequent. Responsibility for the patient's life arises frequently in a variety of ways. If the "turnover" theory is to be applied logically the assistant throat surgeon performing several thousand tonsillectomies per annum should be more highly remunerated than the senior general surgeon performing only a few hundred major operations in the same period.—I am, etc.,

Birmingham. F. A. BLEADEN.

Spinal Pumping

SIR,—In the *Journal* of July 12 (p. 62) there appeared an annotation on "Spinal Pumping" which could be construed as meaning that an "iron curtain" on medical information exists between Eastern and Western Europe, and a complaint that Speransky's work had been buried in the Russian language. I am much further away from this "iron curtain" (which was invented by Goebbels and resurrected by Churchill) than the author of the annotation, but find that all the evidence *re* this figment of a Nazi's imagination is negative: there is no iron curtain.

The simple expedient of perusing the *B.M.J.*, for instance, informs me that there was recently (June 27) a meeting of the European Association of Clinical Pathologists at Cambridge, where for one country at least behind the "iron curtain"—Czechoslovakia—there was a representative. On July 26 there was an International Congress for Microbiology in Copenhagen, where "most other European countries [than Scandinavia, England, France] were represented." From June 24 to 28 there was the Medical Women's International Association at Amsterdam, which included delegates from Finland, Poland, Hungary, and Czechoslovakia; and from July 21 to 25 the International Physiological Congress was held, at which delegates from Hungary and the U.S.S.R. were present. Again, there is no difficulty in subscribing to Soviet medical journals, and to such papers as *American Review of Soviet Medicine*, *Soviet Weekly*, and *Slavonic Review*, which contain a fair selection of contemporary Russian medical work. And how did the geniuses of the *Bulletin of War Medicine* penetrate this opaque "iron curtain"? One is driven to suspect Soviet agents at work in the most apparently innocent places.

Finally, later communications showed that Speransky's work and ideas were by no means buried in the Russian language but were known to those who had intelligence and lack of prejudice enough to find out whether they really were available before they started to ape the gibberish of the Hitler Propaganda Ministry. How would we feel if the Russians accused us of burying our medical works in the English language instead of being jolly gentlemen and sedulously translating every word we write into Russian? Apart from thinking them to be madmen, we would consider them damned impudent, and rightly so.—I am, etc.,

Perth, W. Australia. L. R. JURY.

A Protest

SIR,—I was amazed to read in a daily newspaper of a British doctor being taken to the assizes for throwing a brick through the shop window of a Jewish citizen of this country. It is a most terrible blot on the medical profession in this country, and brings back to all who read such a thing memories of the typical Nazi actions of the German doctors during the Hitler regime. If we in our profession act as typical thugs, our great profession is lost. This action of the above doctor requires a most severe reprimand from the profession. To-day is the time to uphold the dignity of our calling, not to insult it.—I am, etc.,

Preston, Lancs. A. E. BERNSTIEN.

POINTS FROM LETTERS

What is Male Climacteric?

Dr. C. L. MALHOTRA (Sarangarh) writes: There has been a good deal of talk about the male climacteric. The female climacteric is a well-known and recognized entity, with definite symptoms, age of onset, aetiology, and to all intents and purposes the cessation of pregnancy, barring exceptions, the last being the most important. In the male climacteric, so-called, this last factor is wanting, for there is no age beyond which a man can be said to be infertile. . . . Nor does the desire vanish with age . . . The enlargement of the prostate gland in the male, associated with increasing years, is in fact said to increase the desire. Wherein lies the male climacteric then? It would appear more probable that in late middle life the fighting male may suffer from the effects of the fight—a variety of nervous depletion or fatigue, which he ascribes to the male climacteric. It may also be that the male does not desire to be excelled by the female in having one disease less.

Sodium Bicarbonate as an Antiseptic

Dr. HEDDA GORZ (Polish Hospital, Storrington) writes: During the insurrection in Warsaw we were very short of all drugs, particularly of antiseptics. We used a solution of 5% sodium bicarbonate for dressing of wounds as well as for operation. The results appeared to be excellent. All of us were greatly satisfied of obtained results, and I used it afterwards in my further practice. . . . For two months the patients were treated in cellars and other very inadequate conditions without water and drugs. Working in such terrible conditions—field hospitals arranged in cellars and underground shelters—all patients whose wounds were open, dirty, and contaminated with dust of the bombed houses were only treated with the 5% solution of sodium bicarbonate, the only one obtainable there. All heavy cases in badly ventilated cellars became tolerable after dressing with this solution, even open lung wounds notorious for their fetor as well known to every surgeon. . . .

Australian Chapel of Remembrance

Major N. KEITH BUSHELL (late No. 3 Australian General Hospital) writes: In the picturesque and typical English country churchyard of Harefield, in Middlesex, there lie the remains of 110 Australian soldiers, sailors, munition workers, and one Australian nursing sister. These died from wounds and sickness in No. 1 Australian General Hospital, which was stationed in Harefield in the first world war, and many of them were badly wounded men from Gallipoli in 1915. These graves have been cared for by the Imperial War Graves Commission and the devoted ministrations of many of the Harefield people. . . . The almost inevitable outcome of this true spirit of imperialism, inspired by the late head master of Harefield and so well fostered by the present vicar, is the representative Australian desire that a chapel in the old and historic church of Harefield should be converted into an Australian chapel of remembrance to cover both the world wars. An executive committee has since been formed for this purpose, and I am honoured by being asked to act as the hon. sec. and treasurer of it. In order that this chapel of remembrance may be made beautiful in quality and Australian in feature, it is necessary to appeal for no less a sum than £5,000. Any contributions that English friends care to send will be welcomed and appreciated, but this appeal is made primarily to Australians resident in Britain, and especially to those who were with the Australian Imperial Forces in the first world war. Contributions to this fund should be addressed to me c/o the National Bank of Scotland, 18–20, Lower Regent Street, London, S.W.1, when they will be officially acknowledged.

Warm Houses

Dr. G. C. PETHER (Hadley Wood, Herts) writes: With cuts in our rations it is surprising that more thought is not given to the possibility of keeping our houses warmer while reducing our heating bills, both for coal and for food. In an experimental house the provision of a small air space and wood panelling made an enormous reduction in the time required to bring the wall temperature up to the room temperature. Under standard conditions the period fell from 9 hours to 20 minutes. It is not often realized that in heating up the walls unnecessarily we lose comfort and also money. Similar economies are possible if double windows are fitted and heat losses through roofs are cut down. I think the dietitians might take heart and think of indirect means of reducing our calorie requirements.

Obituary

W. ROWLEY BRISTOW, F.R.C.S.

Mr. Walter Rowley Bristow, orthopaedic surgeon to St. Thomas's Hospital, died in a London nursing-home on Nov. 10 at the age of 64.

Mr. Rowley Bristow was a student at St. Thomas's Hospital. He took the conjoint diploma in 1907, and graduated M.B., B.S. a year later, going on to take the F.R.C.S. in 1909. As a student he played regularly in the soccer, lawn tennis, and water polo teams. After holding a number of house appointments, including that of house-surgeon to Sir George Makins, he decided to devote himself to traumatic surgery. During the 1914–18 war he began his long connexion with the Army, serving first as R.M.O. with the Middlesex Yeomanry in Egypt and Gallipoli. He was mentioned in dispatches for his services at Suvla Bay. In 1916 he was appointed surgeon at the Military Orthopaedic Hospital at Shepherds Bush, where he first became interested in some of the applications of electrotherapy and where also he began his long friendship with Sir Robert Jones, who was then his chief.

As part of the post-war scheme of reconstruction at St. Thomas's in 1919 an orthopaedic department was established with Sir Robert Jones as titular head. Bristow was elected as his assistant, but was in fact from the start its real director. He continued his connexion with the Shepherds Bush Hospital, remaining as consulting surgeon after it had been handed over by the War Office to the Ministry of Pensions. His growing reputation led also to his appointment as consultant to the King Edward VII Convalescent Home for Officers and to the Orthopaedic Hospital, Pyrford, among other hospitals. His connexion with Pyrford provided a valuable addition to the limited facilities at St. Thomas's, and it became virtually a county annexe for orthopaedic patients. The Royal College of Surgeons elected him Hunterian Professor in 1935, when he took as his subject "Internal Derangement of the Knee-joint." He also gave the Hugh Owen Thomas Memorial Lecture in 1937, and in the same year was president of the British Orthopaedic Association, of which he was one of the founders. In the recent war he was consultant in orthopaedic surgery to the Army, with the rank of brigadier, and was largely responsible for the establishment of efficient orthopaedic services in every theatre of war. He was at one time president of the Orthopaedic Section of the Royal Society of Medicine, and he had been vice-president of the Section of Orthopaedics at the annual meetings of the B.M.A. in 1931 and 1932. He was a corresponding member of the American Orthopaedic Association and an honorary member of the French and Belgian Orthopaedic Associations. He married, in 1910, Florence, the only daughter of Dr. James White, LL.D., and had one son and two daughters.

We are indebted to Mr. George Perkins for the following appreciation: By the death of W. R. Bristow, known to thousands as Rowley and to his intimates as Walter, English medicine has lost one of its most colourful personalities. A link with the past has been severed, for essentially he belonged to the pre-war era. Wherever he went and whatever he did, his presence was felt. Like Dr. Johnson, he craved for company and fully repaid his audience for their society. No. 102 was, at least to one of his admirers, like no other house in Harley Street, because Bristow lived there, and live he did. No one ever enjoyed life more. Not for him the sedate backwater of a university city: the hurly-burly of busy London was his purlieu. He breakfasted at 8.0 and was in his office by 8.30. From then until 7.30 in the evening, with a break for lunch, at which there was never less than one guest, he worked at top pressure, expending his own depthless energy and exhausting that of his secretaries. There followed a champagne cocktail and a change for dinner. Dinner was an occasion. He had one of the best cooks in London, and could talk intelligently to any *chef de cuisine* on his own subject. When he was told the nature of his fell disease, he received his sentence of death with philosophic resignation. "Well, I have had a damned good life," he said; and how true it was. As a host he was in a class apart. He had the knack of making the humblest of his guests feel that he was important, and no one can do that who does not love his fellow men. His attributes were legion. He was a scratch golfer, a good shot, an ardent fisherman, and a good bridge player, and although his opponents did not always agree with his own estimate of his prowess he usually won.

As a student he was remarkable for getting through his examinations without doing any work. As an orthopaedic surgeon he was remarkable for knowing the latest work without doing any reading. After he had been invalided home from the Middle East in the Great War he came in contact with Sir Robert Jones. There followed a firm friendship broken only by Sir Robert's death. In the late war he did what Sir Robert would have done had he been alive. Many consider that Bristow's best work was done during this period. He threw his heart and soul into the establishment of an efficient orthopaedic service for the Army, and personally recruited most of the surgeons. The casual way in which his services were officially recognized demonstrates how much was expected of him. That Rowley Bristow could and would do it was taken for granted. During his years as president, the British Orthopaedic Association flourished as never before. Those members who went with him to Scandinavia were proud of their leader. But as an orthopaedic surgeon his loss will be felt most by his innumerable patients, and by members of the orthopaedic department that he created at St. Thomas's Hospital. All his life the hospital came first. His views did not always coincide with those of his colleagues, yet none of them doubted but that his actions were intended to add to the lustre of the hospital he so truly loved.

It is natural for his alumni to venerate his memory, for no one could have had a more loyal chief. He backed up his juniors through thick and thin, and accepted the blame for all their mistakes. He went out of his way to advance all who had trained or worked under him. Many of his juniors have reason to remember his generosity. Nobody is missed for long, but those who knew Bristow will cherish his memory for as long as they live.

G. R. G. writes: Walter Rowley Bristow will be most sorely missed, for he was a man of remarkable and altogether delightful character, endowed with outstanding vigour and zest for life and fellowship. He was the central figure of a great group of friends which included all his colleagues and many of his patients. He will be very gravely missed by orthopaedic surgeons all over the world, for when he and Robert Jones came together in the first world war he found his true vocation and soon became one of the most eminent orthopaedic surgeons, trusted universally for his sound judgment, ability, and sincerity. He taught well, penetrating to the heart of his subject and picking on the essentials with clarity and emphasis. His out-patient clinics at St. Thomas's were stimulating, memorable, and crowded. They were alive with humour and humanity, for he never failed to feel and show a friendly intimacy with the Lambeth folk. In the war he gave splendid and unsparing service, especially in developing a first-class orthopaedic organization in the Army. A conscientious student of everything he took up in work or play, he quickly made himself master of style and craftsmanship; his keenness was infectious, his influence admirable, his presence a joy. He has left us while still at the height of his powers.

SIR ROWLAND MALLETT, M.D.

Sir Frederic Rowland Mallett, for thirty-six years an honorary consulting surgeon of the Bolton Royal Infirmary, died suddenly on Oct. 29 at his home at Minchinhampton, Gloucestershire, at the age of 78. He was educated at Rossall and Edinburgh University, where he graduated in 1891, proceeding M.D. five years later. He was appointed to the staff of the Bolton Royal Infirmary in 1893. This appointment continued a remarkable family record of unbroken service which, including that of his father and his grandfather before him, totalled 113 years. Sir Rowland always took a keen and active interest in medical and surgical matters, and particularly in the welfare and activities of the Bolton Royal Infirmary, of which he was appointed president in 1929.

Unfortunately he had to relinquish this post in 1945 owing to ill health.

In addition to his professional duties he undertook much public work. He was honorary secretary of the local medical war committee in the 1914–18 war. He was a member of the town council for many years, chairman of the Bolton Division of the B.M.A., 1926–8, chairman of the Local Medical and Panel Committee and of the Bolton Division of the British Red Cross Society, and he held many other posts. He was knighted in 1934, the year before he went to live in Minchinhampton, in recognition of his long and devoted service to the Bolton Royal Infirmary. His outstanding characteristics were his sound judgment not only in his professional work but in all matters, his unswerving loyalty to duty, his patience and courtesy in all circumstances, and his interest and sympathy in human affairs. All these endeared him to a host of friends, and no man was more respected in the town in which he was born and worked for most of his life.

He married in 1901 Mary Constance, daughter of Mr. C. W. Dixon, and had one son and three daughters.

Dr. ARNOLD GREGORY died on Oct. 31 at the age of 68. The son of a Congregational minister, he qualified M.R.C.S., L.R.C.P. in 1902. After holding house appointments at the Leeds Infirmary and Ida Hospital, he came to Manchester in 1906 as a general practitioner. During the 1914–18 war he served in the R.A.M.C., chiefly in India, where he contracted malaria. A member of the British Medical Association since 1907, he served for many years on the local executive committee, and was a representative in the Representative Body from 1929 to 1939, and from 1941 to 1943. He was a member for eleven years of the Charities Committee, and he used every opportunity to further its activities. He was on the Local Medical and Panel Committee for many years, acting as its honorary treasurer from 1927 to 1945. A member of the Manchester Medical Society from 1906, he served on the committee for two periods, and became a vice-president in 1930. In 1935 he was president of the Society—a rare distinction for a general practitioner. He was keenly interested in medical education and its application to general practice, and made this the subject of his presidential address to the Manchester Medico-Ethical Society. He was always especially interested in the patient's point of view and in the welfare of chronic invalids. He will be sorely missed by his patients, as also by his fellow practitioners, whom he has served so faithfully and well. He leaves a widow, a daughter, and three sons, two of them members of the medical profession.

Dr. HUGH MCKERLIE died on Sept. 28 at his home in Manchester at the early age of 47. He had been ill for many months but had recovered sufficiently to resume work, when a sudden haemoptysis put an untimely end to a busy and useful life. After his early education in Dumfries he entered Glasgow University and qualified in 1921, graduating M.B., Ch.B. a year later. He held a resident appointment at Wakefield before starting general practice in Manchester. Full of common sense and ability to get on with all sorts and conditions of people, he had a sound knowledge of his work and soon built up a large practice. He devoted considerable time to the interests of the profession, serving for the last ten years as secretary of the Manchester Panel Committee, and being also on the Manchester Insurance Committee and attending many panel conferences. He was also chairman of the Manchester Division of the B.M.A. from 1939 to 1943, and a member of the local Medical War Committee. His death is a great loss to his colleagues, his patients and friends, and most of all to his two sons.

Dr. WILLIAM HAIG died at Crieff on Nov. 2 at the age of 76. Dr. Haig had conducted an extensive general practice in the area for forty-three years, retiring only in 1942. Of a quiet and retiring disposition, his human understanding and many kindnesses made him a well-loved and respected figure in the district. He was a student at Edinburgh and graduated in 1894. A cousin of the great Field-Marshal, Dr. Haig served with distinction during the 1914–18 war, reaching the rank of major and being awarded the D.S.O. For a number of years after the war he was president of the local branch of the British Legion. During the second world war he acted as welfare officer for all the troops in the Crieff area, and for most of that period was chairman of medical boards for Perthshire. He was honorary physician and surgeon to Crieff Cottage Hospital, and had many other interests. He was senior elder in St. Michael's Parish Church, Crieff; had held high office in Freemasonry; was one of the oldest members of the Ancient Order of Forestry and official surgeon to that body, a member of the local committee of the Overseas Club, a strong Unionist, and in his younger days an enthusiastic member of the local golf club. He was keenly interested in the local Ambulance Brigade, having been its lecturer for many years. Dr. Haig was a member of the B.M.A. for fifty years, and had held the following offices: representative in the Representative Body on thirteen occasions at intervals over the years 1909–39; member of the Insurance Acts Subcommittee (Scotland), 1928–38; president, Perth Branch, 1932–3; member, Scottish Committee, 1934–7; and he was also a member of the Charities Committee, 1937–8. He is survived by a brother and sister.

Dr. STEPHEN GREEN died on Oct. 31 after a long illness. He graduated M.B., Ch.B. in Manchester in 1906, and was a house-physician at the Manchester Royal Infirmary. Later he held a house appointment in Winchester, and was resident medical officer at the Royal National Sanatorium at Bournemouth. He took the D.P.H. in 1906, and started his work in Portsmouth as schools medical officer before going to St. James's Hospital as a medical officer. He then joined his father, Dr. James Green, and his brother, Dr. Philip Green, in general practice. He was one of the Portsmouth doctors who remained there throughout the war and carried on his work through all the difficult "blitz" period. He leaves a widow and two sons.

Medico-Legal

MEDICAL EVIDENCE IN PENSION CASES

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

The application of the law of war pensions has raised many difficult problems, especially of legal proof, and Mr. Justice Denning is to be respectfully congratulated on the patience and skill which he has brought to their solution, and on his comprehension of the medical issues involved. In the course of a recent appeal[1] he gave some useful directions to medical men who are asked for their opinions in disputes on whether a patient is entitled to a war pension or not.

A regular Army officer was taken to hospital in 1944 with cancer of the oesophagus, was sent to England, and died a month after the diagnosis had been made. His widow claimed the higher rate of pension given to a widow whose husband's death is due to war service. The tribunal had dismissed the claim. The learned judge explained that in cases where a man is passed fit at the beginning of his service but is later afflicted with a disease which leads to his death or discharge there is a compelling presumption in his favour, and to displace it the Minister must prove beyond reasonable doubt that the disease was not attributable to nor aggravated by war service. The evidence against the claimant must be as strong as that needed to convict a person of a crime. On the other hand, there is no need for it to amount to a certainty. If it leaves a remote possibility that can be dismissed with the sentence, "Of course it is possible, but not in the least probable," the case is proved beyond reasonable doubt.

Naturally in these cases much of the evidence is medical, and the judge emphasized that it is useless for a medical man to give an opinion that a disease is or is not attributable to, or aggravated by, war service without giving his reasons. Such an opinion involves not only his scientific knowledge but also his views on causation and on the meaning of terms such as "attributable" and "war service," which are matters for the tribunal and not for him to decide. He must not usurp the functions of the tribunal, but he should point out the probable or possible causes of the disease and of any aggravation of it, giving the degree of probability and then leaving the tribunal to decide whether on the facts the claim should be allowed. In cases where the aetiology is known, there should be little difficulty in stating the causes of the disease and of any aggravation of it, but cases where the aetiology is unknown or imperfectly known present great difficulty. If nothing else appears except that the cause is unknown, then it may be a cause incidental to war service and the Minister cannot prove

[1] *Miller* v. *Minister of Pensions*, 1947 2 All E.R. 372.

that it is not. That is what once happened in a case concerning Hodgkin's disease. In many cases, however, although the aetiology is unknown, experience and statistics are able to throw light on the circumstances in which the disease arises or develops. For instance, although the precise cause of schizophrenia is unknown, experience shows that in the great majority of cases it is essentially independent of external circumstances, and that therefore in a given case the probability that it is not attributable to war service may be high enough to defeat the strong presumption in favour of the claimant. On the other hand, if there is a reasonable suggestion that any incident of war service, such as exceptional strain immediately before the onset of the symptoms, may have played a part, the claim may succeed, because statistics show that in a minority of cases schizophrenia has been preceded by severe stress.

The little knowledge of the cause of cancer possessed by medical men is based on experience and statistics. The high incidence of carcinoma of the scrotum in chimney-sweeps warrants the inference that the irritation of soot plays a part. No such observation, however, supported the present claim. One medical witness thought that this cancer might have resulted from the irritation of sand swallowed in the Middle East, but other experts dismissed that idea as highly speculative and quite outside the bounds of probability, because of the rarity of cancer of the oesophagus in men serving in the desert. Another suggestion, that it might have been due to the drinking of spirits or of excessively hot liquids, was rejected on the ground that oesophageal cancer is predominantly a male disease and that these habits are not confined to men; in any event these habits are personal ones and not attributable to war service. For the Minister it was stated that for all practical purposes cancer is not regarded as infectious or contagious, and that cancer of the oesophagus is not related to employment or environment. Moreover, only 45 cases in Service men were reported over the period of the entire war—7 cases a year against the 1,700 known to occur in the whole country. There remained the doubt, due to the unknown aetiology of cancer, that war service might have played some part. One expert said that he could not state with any degree of certainty that Service factors had played no part, and another said that he could not assert that nothing whatever in the environment had had an influence in causation.

The tribunal had come to the conclusion that the whole of the probabilities were that war service played no part. There had been a possibility the other way, but they had dismissed it as too remote. That was a reasonable conclusion to come to, and so the judge held that they were right and dismissed the appeal.

The Services

The following officers have been awarded the Efficiency Medal (Territorial): Lieutenant-Colonel T. W. Preston, Major (now Lieutenant-Colonel) W. H. Wolstenholme, O.B.E., Captain (now Major) J. R. Hamerton, and Captains (Honorary Majors) D. P. Holmes and J. A. Reid, R.A.M.C.

DEATHS IN THE SERVICES

Lieut. ALEXANDER MCKENZIE ELLIOTT, recently R.M.O. of the 3rd Battalion, Parachute Regiment, 6th Airborne Division, died on Oct. 7, as the result of an accident, at Haifa Military Hospital, Palestine. Lieut. Elliott, who was 25, graduated M.B., B.Ch., in 1945. He was a student at Cambridge University and after qualifying he held a senior house appointment at Hope Hospital, near Salford, before being commissioned in January of this year.

A circular from the Department of Health for Scotland has been sent to local authorities asking them to submit to the Secretary of State proposals for discharging their functions under the National Health Service Act. The proposals must be submitted by specified dates, the last of which is Feb. 28, 1948. The circular urges local authorities to hold consultations with Executive Councils, Regional Hospital Boards, and voluntary organizations as soon as possible, and suggests the joint establishment of advisory co-ordinating committees for suitable areas.

Medical Notes in Parliament

Discussions with the Minister

On Nov. 13 Sir HENRY MORRIS-JONES asked the Minister of Health whether he would make a statement on the result of his negotiations with the representatives of the medical profession on the terms and conditions of service under the National Health Service Act, 1946. Mr. BEVAN replied, "The time to decide that is when the discussions are complete."

Sir ERNEST GRAHAM-LITTLE had asked on Nov. 10 for an estimate of the number of general practitioners and of specialists which would be required to warrant putting into operation in July, 1948, the National Health Service Act, 1946. He further asked what measures had been taken to provide additional hospital accommodation, health centres, and other buildings required to carry out the provisions of the Act.

Mr. BEVAN replied that the National Health Service would be brought into operation with the resources available at the appointed day. These resources would be extended as circumstances permitted.

Calories

Major LEGGE-BOURKE inquired on Nov. 10 how the daily calorie content of the weekly minimum amount of food regarded as necessary for an unemployed man, as decided by the Ministry of Health in co-operation with the British Medical Association in 1933, compared with that of the present ration after the reduction recently announced by the Government.

Mr. STRACHEY said that the calorie value of the No. 2 diet suggested for an adult man by the British Medical Association in 1933 was 3,386 calories daily. As announced by the Minister of Economic Affairs the recent reduction in distribution would result in an estimated average daily calorie intake of just below 2,700 per head for the whole population. This took into account the rationing of potatoes. The cut in potato consumption represented 70 calories.

Mr. Strachey stated on Nov. 11 that the present calorie values of rationed foods for a normal adult were:

Meat	117
Bacon	15
Cheese	33
Butter	61
Margarine	124
Lard	36
Sugar	123
Bread	648
Milk	102
Preserves	41
	1,300

These figures were the calories derived from the rations of a normal adult and did not include eggs nor points-rationed foods.

Asked by Mr. BUTCHER on Nov. 10 whether patients in hospitals and nursing-homes would suffer the recently announced cut in civilian rations, Mr. STRACHEY answered that residents in hospitals and nursing-homes were entitled to the same rations as the domestic consumer. Additional foods considered necessary on medical grounds could be obtained in the same way as for people suffering from similar complaints at home. Special cuts of 15% or 17½% in the allowance of various rationed and controlled foods to certain catering establishments made because of the crisis were not applied to residents in catering establishments or anyone in institutions.

Cholera in Egypt

Sir HENRY MORRIS-JONES asked Mr. Bevin on Nov. 12 his opinion on a letter from the Egyptian Feminist Union accusing the British Army in Egypt of responsibility for the origin and dissemination of cholera.

Mr. BEVIN said this extremist attack was unworthy of a reply. It would only be believed by those already hopelessly prejudiced against Britain. The thanks of the Egyptian Government had been conveyed to him for what Britain had done against the outbreak. Besides the vaccine, over 60 ambulances had been made available, and also the services of Sir J. Taylor and Dr. Bruce White.

Mr. OSBORNE inquired on Nov. 12 why the squadron of heavy bombers which left Binbrook, Lincolnshire, aerodrome on a goodwill mission to the Turkish Air Force landed in Egypt on the outward journey in view of the presence of cholera in Egypt, and what was the cause of the death of one of the aircrew immediately on his return to this country.

Mr. ARTHUR HENDERSON replied that this squadron landed at an R.A.F. station in the Canal Zone of Egypt as part of its training programme. All members of the squadron were inoculated against cholera before leaving the United Kingdom. A member of the squadron died shortly after landing in this country. His death was due to the effects of lack of oxygen.

Proprietary Medicines

Asked on Nov. 11 by Captain FIELD to ensure a better use in the national interest of the labour and materials put into proprietary and quack medicines, Mr. BELCHER replied that drugs, chemicals, and other raw materials were allocated for the manufacture of proprietary medicines only when the needs of hospitals, doctors, and dispensing chemists had been met. Mr. Belcher hesitated to condemn such medicines generally. They made a useful contribution to the export effort.

Mental Illness

Mr. MICHAEL STEWART stated on Nov. 11 that 646 patients were in military hospitals suffering from mental illness. It was impossible to say in how many of these cases the condition might be regarded as due to war service. A decision on that was not taken till some time after admission, or, in many cases, not until after discharge. He added that the treatment of Service psychotic patients was well up to the standard of civilian hospitals.

Petrol for Doctors.—Mr. LESTER HUTCHINSON asked on Nov. 6 whether the Minister of Fuel and Power would allow medical practitioners, with a limited amount of time at their disposal, who had to be on call all day and every night, to use their cars for all purposes within a radius of ten miles of their consulting-rooms, to permit them some measure of relaxation and yet remain within speedy recall. Mr. GAITSKELL replied that this matter, on which he had received certain representations from the British Medical Association, was under consideration.

Refresher Course.—On Nov. 6 Mr. SOMERVILLE HASTINGS asked whether regulations existed under the National Health Service Act, 1946, for Regional Hospital Boards to arrange for refresher courses for any of those in their employ. Mr. BEVAN replied that such regulations were unnecessary. He said he would see that the Boards encouraged their officers to keep up to date by whatever methods were most appropriate. They would be able to allow leave with pay for attending suitable conferences and courses.

German Doctors.—Mr. HASTINGS was told by Mr. SHINWELL on Nov. 11 that 373 German doctors were employed in the United Kingdom to provide medical services for prisoners of war. These doctors received instruction in British health administration and in the British way of life.

Regulation 33B.—Answering Col. STODDART-SCOTT on Nov. 13, Mr. BEVAN said Regulation 33B would lapse at the end of this year. He did not propose to substitute any other compulsory powers but to encourage the use of persuasion to bring contacts under treatment.

Smallpox.—Mr. BEVAN states that on Nov. 13 there were no cases of smallpox in England and Wales. Since the year 1932 no death of an infant in England and Wales under the age of one year has been attributed to smallpox.

Nystagmus and Dermatitis.—In 1938 1,224 certificates of disablement were given by examining surgeons under the Workmen's Compensation Act for miners' nystagmus, and in 1946 1,297. Corresponding figures for scheduled dermatitis produced by dust or liquids were respectively 254 and 1,702.

Unstable Adolescents.—Mr. Chuter Ede is keeping in mind the contents of the report of the Joint Committee of the British Medical Association and the Magistrates Association on the problem of the unstable adolescent girl as it affects the Home Office in the continuous efforts to develop effective methods of treatment for such girls.

Sir George Henderson, Secretary of the Department of Health for Scotland, told members of the Northern Regional Hospital Board recently that both as a Board and as individual members their responsibility was to the Secretary of State alone. They were not appointed to represent—in the ordinary meaning of the word—any particular body or interest. Most of them had been appointed after consultation with various bodies and their names had been put forward by those bodies, but in their work on the Board they did not *represent* those bodies: they had been selected by the Secretary of State for the personal contribution which their particular form of knowledge and experience could help them to make. The fact that their collective experience had been so varied ensured that all necessary viewpoints could find expression. All that remained was that the various experiences should weld together in harmony.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The following degrees were conferred on Nov. 1:

M.D.—R. T. Mummery, E. Clayton-Jones, C. R. T. Lane, W. A. Nicholson W. H. K. Willis, P. D. Scott.

T. Hoogstraten, M.D., has been elected to a Frank Edward Elmore Fund Studentship, from Nov. 1.

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

THIRD M.B., B.S.—O. A. N. Husain (with honours and distinguished in applied pharmacology and therapeutics), S. Adler, G. C. Ambrose, G. J. Amiel, G. W. S. Andrews, D. E. Argent, D. A. L. Ashforth, A. W. Banks, A. F. Barnett, J. H. Baylis, R. W. Bazeley, Nancy Benstead, F. V. A. Bosc, D. P. Bowler, P. R. Boyd, J. C. Brace, W. Ll. Brace, J. P. Bradshaw, D. J. Brewer, D. Brown, D. A. G. Brown, T. C. L. Brown, R. H. Browning, Alison M. Brydone, Joyce M. Buck, J. Bullough, R. A. Bush, A. W. H. Challis, M. S. Chayen, A. H. Cheshire, D. J. E. Cheshire, P. W. Clements, K. L. Cleminson, J. H. H. Clough, Pauline M. Cole, L. H. Collier, E. G. Cook, Olive Cooke, D. J. Cowan, D. H. Crook, A. D. Crown, S. P. Datta, D. W. Davies, W. M. Dixon, G. W. Downes, Wendy Dyer, K. C. Easton, C. D. Edwards, D. Edwards, L. R. L. Edwards, J. W. Ellis, J. Elstub, Angela I. Emerson, M. Ernest, J. W. G. Evans, M. P. Fiddian, D. H. Forsdick, T. W. H. Forster, Dorothy P. Fortey, G. S. Foster, P. S. Gardner, C. D. Garratt, E. Geiringer, P. Glasman, S. Goldwater, R. A. Goodbody, E. R. Griffiths, P. Griffiths, A. P. Grimbly, H. J. Groves, G. J. Hadfield, E. Haigh, R. C. Hallam, S. J. Harris, Ursula M. Hay, J. L. Hayward, A. J. Heber, C. J. V. Helliwell, Mary Helmer, E. P. W. Helps, A. G. Henderson, S. R. Hewitt, A. W. Hind, Miriam Hirtzel, K. E. Hodge, G. R. Holtby, P. K. Hopper, P. W. Hunt, R. J. Isaac, Pauline M. Jackson, M. A. K. Javid, B. A. G. Jenkins, D. H. Jenkins, M. S. Johnson, E. G. G. Jonas, C. Jones-Morgan, W. A. Karunaratne, A. J. I. Kelynack, J. V. Kilby, C. R. Knappett, A. Knudsen, F. Kohiyar, J. S. Lambe, Celia P. Larkins, Joan Latham, S. Leigh, E. L. W. Leiser, Ursula E. K. Leitner, Lillian J. Letty, W. K. Lim, Muriel J. Lowe, J. C. McDonald, N. J. C. McGill, D. Y. Mackenzie, A. C. McLeish, R. I. Maitland, J. E. Mandel, F. B. Meade, E. W. Miles, B. C. Morgan, R. Morgan, J. B. Morrison, F. J. Napier, E. Neumark, R. D. Nicholson, E. G. Old, Susan H. Palmer, J. A. R. Parker, A. Paton, B. G. Pickles, A. Pilling, G. D. Pinker, W. A. Porter, Diana Powell-Cotton, S. H. M. Price, Audrey K. Raistrick, R. L. Ray, D. M. Reader, Pauline Readman, E. J. Rich, R. W. Riddell, Adoré H. Rider, E. Robinson, D. J. H. Rogers, R. H. Satchell, J. S. Scott, T. A. Shannon, D. A. Skan, B. C. Smith, H. Spira, J. D. Stevens, H. H. A. E. Tarnowski, P. W. G. Tasker, D. P. P. Thomas, W. R. G. Thomas, E. J. Trimmer, J. C. Turner, P. A. Tyser, G. F. Vaughan, P. J. F. Walsh, J. L. Warren, G. L. Whitmore, F. O. W. Wilkinson, D. W. Wilks, R. D. Willcock, J. R. D. Williams, R. G. Williams, P. Wilson, G. Wiseman.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

Dr. R. M. Stewart, F.R.C.P., will deliver a Morison Lecture on "The Clinical Features and Pathological Anatomy of Infantile Hemiplegia" before the Royal College of Physicians of Edinburgh (9, Queen Street, Edinburgh) on Friday, Nov. 28, at 5 p.m.

A quarterly meeting of the College was held on Nov. 4, with the President, Dr. D. M. Lyon, in the chair.

Drs. H. M. D. Shepherd (Shanklin, I.o.W.), P. M. Wood (Halifax), John Craig (Aberdeen), J. McG. Rogan (Glasgow), J. M. Macfie (Edinburgh), A. W. Wright (Edinburgh), Charles Cameron (Edinburgh), Neil Macmichael (Edinburgh), and J. A. L. Gilbert (Edinburgh) were introduced and took their seats as Fellows of the College.

Drs. J. D. M. Claassens (Cape Town), J. M. Watt (Johannesburg), I. N. Sutherland (Edinburgh), G. Singh (Amritsar), R. O. Gillhespy (Paisley), J. G. Macleod (Edinburgh), G. M. Wilson (Edinburgh), R. S. Aitken (Aberdeen), and T. G. Brown (Hamilton, Lanarkshire) were elected Fellows of the College.

Drs. W. H. Rose (Ontario), K. G. W. James (Jamaica), A. S. R. Stewart (Shotts, Lanarkshire), Jack Rudolph (Pretoria), J. A. Ross (Rainhill, Lancs), J. B. H. MacArthur (Nottingham), I. H. L. Gillies (Dumfries), H. J. T. Ross (Kidderminster), W. J. G. Barrie (Edinburgh), W. G. MacDougall (Edinburgh), J. W. Rae (Larbert, Stirlingshire), K. K. Datey (New York), E. M. Heller (Ontario), H. G. H. Richards (Cullercoats, Northumberland), J. K. Drummond (Durban), H. G. H. Houghton (Edinburgh), Niels Pedersen (Edinburgh), P. E. Brown (Bath), J. W. Buchanan (Barnton, Midlothian), M. W. Archdall (Lampeter), Thomas Black (Newcastle-upon-Tyne), G. B. Tait (Edinburgh), A. W. O. Taylor (Edinburgh), D. E. Williams (Edinburgh), Aneurin Hughes (Swansea), W. L. Sharp (London), Alexander Skene (Edinburgh), H. R. L. Fraser (Edinburgh), N. W. Horne (Edinburgh), J. B. Lowe (Edinburgh), H. D. Ross (Edinburgh), Erich Kahn (London), Malcolm Watt (Wellington, N.Z.), A. E. Claireaux (Edinburgh), J. W. T. Pretsell (Surbiton), A. G. Harper (South Canterbury, N.Z.), T McS. Wilson (Edinburgh), A. K. Das (Calcutta), H. C. W. Stringer (Christchurch, N.Z.), J. T. R. Russell (Edinburgh), and Constance C. Forsyth (Edinburgh) were elected Members of the College.

The Freeland Barbour Fellowship for original investigations carried out in the laboratory of the College was awarded to Lieut.-Col. W. F. Harvey, C.I.E., and the Wood Bursary for students commencing the study of medicine at the Edinburgh Medical School to Thomas Meredith Chalmers.

Medical News

Nobel Prizes

The Nobel Prize for Chemistry has been awarded to Sir Robert Robinson, P.R.S., "for his research on important substances in plant biology, especially alkaloids." The physics prize has been awarded to Sir Edward Appleton, F.R.S., "for his work on atmospherical physics, and especially for his discovery of the Appleton layer."

Royal Society Awards

The King has approved the recommendations of the Council of the Royal Society for the award of Royal Medals for the current year to Prof. C. N. Hinshelwood, F.R.S., for his distinguished work on the mechanism of chemical reactions from the simplest gas phase processes to the complexities of cell division, and to F. M. Burnet, M.D., F.R.S., for his distinguished work on bacteriophages, viruses, and immunity, and for his contributions to the study of infectious disease as an ecological phenomenon. The Royal Society has awarded the Copley Medal to Prof. G. H. Hardy, F.R.S.; the Davy Medal to Prof. L. C. Pauling; the Buchanan Medal to Sir Edward Mellanby, K.C.B., M.D., F.R.S., F.R.C.P., Secretary of the Medical Research Council; and the Hughes Medal to Prof. J. F. Joliot.

Presentation to Sir Alfred Webb-Johnson

A painting of the Council of the Royal College of Surgeons of England for the year 1946–7 was presented to Sir Alfred Webb-Johnson at a dinner given by the Council for that year at the College on Thursday, Nov. 13, in honour of the President and Lady Webb-Johnson. The painting is by Mr. Henry Carr, and the presentation was made by Sir Cecil Wakeley, the senior Vice-President.

New Medical Journal

The first number of the *Journal of Clinical Pathology* has appeared recently. It is edited by Dr. A. Gordon Signy for the Association of Clinical Pathologists, and published by the British Medical Association. The annual subscription for four numbers is 25s. (in U.S.A. $6); single numbers are obtainable at 7s. 6d. The policy of the editorial board is declared to be the publication of original articles, reviews, accounts of technical methods, and abstracts that will be useful to the practising clinical pathologist, whose chief concern is to elucidate disease in man.

Stalingrad Album

A replica of the Stalingrad Album which records messages of greeting from British contributors to the wartime Stalingrad Hospital Fund, organized by the Joint Committee for Soviet Aid, is now on view at the British Museum until Dec. 6. The original of the album is on exhibition at Stalingrad, beside the Sword of Honour presented by His Majesty the King to the City. The albums are outstanding examples of British craftsmanship. The binding, in red Levant leather, was executed by Mr. Frank Vaughan, bookbinder to the late King George V, and the crests were painted by the College of Arms.

Commonwealth Fund of New York

The Commonwealth Fund of New York announces that a number of Fellowships, open to men only, will be offered in 1948. Full details of the Fellowships and copies of the prescribed form of application may be obtained from the secretary to the Committee of Award (Mr. Richard H. Simpson), Commonwealth Fund Fellowships, 35, Portman Square, London, W.1, to whom the completed form must be sent by Feb. 1, 1948.

Braithwaite Nursing Home

The Government of Nigeria have renamed the European Hospital, Port Harcourt, the Braithwaite Nursing Home in honour of Dr. E. C. Braithwaite, C.B.E. Dr. Braithwaite has served in the Colonial Medical Service in Nigeria and the Cameroons for over 35½ years, and for over 13 years, until retiring in April last, was in charge of the European and African Hospitals at Port Harcourt.

Leslie Dana Gold Medal

The National Society for the Prevention of Blindness (1790, Broadway, New York 19, New York, U.S.A.) announces that the Leslie Dana Gold Medal for 1947, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, was presented to Dr. Frederick H. Verhoeff, of Boston, Mass., on Oct. 16. Dr. Verhoeff is Professor Emeritus of Ophthalmic Research at Harvard Medical School and consulting chief of ophthalmology at Massachusetts Eye and Ear Infirmary.

Dr. Jessie Macgregor Prize

The trustees of the Dr. Jessie Macgregor Prize in medical science have announced the award of the prize, value £75, for the present triennial period to Sheila Sherlock, M.D., M.R.C.P., British Postgraduate Medical School, London, W., for her work on the liver, purpura, and malnutrition in the Ruhr.

Trachoma

The International Organization against Trachoma, founded in 1929, held its last general meeting in London in 1939. The Executive Committee met in Paris on May 17 of this year under the presidency of Dr. MacCallan, and it was decided to hold the next General Assembly of Delegates and Members and the Scientific Meeting in London in 1950. The Organization hopes soon to begin publishing its quarterly journal again, *La Revue Internationale du Trachome*. Articles by members of the I.O.A.T. may be sent to Dr. Jean Sedan, 94, Rue Sylvabelle, Marseille. The annual subscription is 25s. Further information may be obtained from the President, Dr. A. F. MacCallan, Westminster Hospital Medical School, 17, Horseferry Road, London, S.W.1.

Pharmacy Working Party

A Working Party has been appointed by the Minister of Health and the Secretary of State for Scotland to investigate the differences in the work of pharmacists in England and Wales and in Scotland in dispensing and supplying medicines and appliances, with particular reference to conditions likely to arise under the National Health Service. The Working Party consists of two pharmacists from England and Wales—Messrs. G. H. M. Graham and D. A. Bryan—and two from Scotland—Messrs A. A. Meldrum and J. Shields—under the chairmanship of Mr. William Penman, M.B.E., a past president of the Institute of Actuaries. The investigation will probably extend from about mid-November to mid-February.

Harveian Society of London and Prehistoric Society

The late Sir Norman Gray Hill, Bt., *M.C.*, R.A.M.C., who was killed in Sicily on Feb. 24, 1944, has left the residue of his estate to be divided between the Prehistoric Society and the Harveian Society of London.

Appointment for Distinguished Services

Dr. A. C. Kathigasu, medical practitioner, Ipoh, Malaya, has been appointed M.B.E. (Civil Division) for services to the Forces during military operations in Malaya prior to Sept. 2, 1945.

Cancer Tests in U.S.A.

A plan consisting of twice-yearly examinations of all women over 40 years old in the State of Delaware has been approved by the Delaware Division of the American Cancer Society. Women who can afford it will pay $3 for each examination.

Wills

Dr. Wilfrid Boothby Blandy, of Nottingham, left £129,127. He left £2,000 to be held for up to fifteen years for the establishment of a faculty of medicine at the University College of Nottingham. Dr. Joseph Stanislaus Gubbins, formerly of Ealing and Hounslow, left £20,918. Mr. Philip Roscoe Wrigley, formerly consulting surgeon to the Manchester Royal Infirmary, left £29,785.

COMING EVENTS

Social Sciences

A conference to consider action to be taken on the Association of Scientific Workers' Report entitled "The Furtherance of the Social Sciences" will be held on Nov. 22 at 2.30 p.m. at Gas Industry House, 1, Grosvenor Place, London, S.W.1. Prof. V. G. Childe will speak on "The Need for the Greater Use of the Social Sciences." Mr. I. Mikardo, M.P., and Mr. R. Innes will open a discussion on future action to win support for the proposals in the Report.

Health and Housing

Mrs. Gilbert, of the British Federation of Social Workers, will lecture on "The Health Visitor and Housing" at the Housing Centre, 13, Suffolk Street, Haymarket, London, S.W.1 (Tel. Whitehall 2881) on Nov. 25.

Society of Chemical Industry

A meeting of the Microbiological Panel of the Food Group of the Society of Chemical Industry will be held at the Chemical Society's rooms, Burlington House, Piccadilly, London, W., on Wednesday, Nov. 26, at 6.15 p.m., when two papers on "Biological Stability of Processed Fish and Manufactured Fish Products" will be presented.

Institute for the Scientific Treatment of Delinquency

The ninth annual general meeting of the Institute for the Scientific Treatment of Delinquency will be held at 8, Bourdon Street, Davies Street, London, W., on Wednesday, Nov. 26, at 6.30 p.m., when the speaker will be the Rt. Hon. Walter Elliot, M.P.

Society of Medical Officers of Health

A meeting of the Society of Medical Officers of Health will be held at B.M.A. House, Tavistock Square, London, W.C., on Thursday, Nov. 27, at 5.30 p.m., when Sir Allen Daley will give an address entitled "My American Diary."

Medico-Legal Society

A meeting of the Medico-Legal Society will be held at 26, Portland Place, London, W., on Thursday, Nov. 27, at 8.15 p.m., when Dr. W. R. H. Heddy, H.M. Coroner, Eastern District, County of London, will read a paper on "Death on the Roads: an Analysis of 200 Fatal Traffic Cases."

Medical Society for the Study of Venereal Diseases

A general meeting of the Medical Society for the Study of Venereal Diseases will be held at 11, Chandos Street, Cavendish Square, London, W., on Saturday, Nov. 29, at 2.30 p.m., when a paper on "Some Psychological Aspects of Venereal Disease" will be read by Dr. E. Wittkower.

SOCIETIES AND LECTURES

ROYAL SOCIETY OF MEDICINE

Section of Odontology.—Monday, Nov. 24, 5.30 p.m. Paper by Miss E. M. Knowles: A Survey of the Dental Condition of Children in Day and Residential Wartime Nurseries.

Section of Medicine.—Tuesday, Nov. 25, 8 p.m. Short papers by Sir Allen Daley: Acute Anterior Poliomyelitis; Dr. A. Margaret C. Macpherson: Some Atypical Primary Tuberculous Lesions; Dr. J. E. Capes: The Use of Tubular Blockade in Penicillin Therapy.

Section of Endocrinology.—Wednesday, Nov. 26, 5 p.m. Discussion: Simmonds's Disease. Openers: Prof. H. L. Sheehan, and Drs. A. W. Spence, Russell Fraser, and S. L. Simpson.

Section of Urology.—Thursday, Nov. 27, 8 p.m. Clinico-pathological Meeting.

Section of Paediatrics.—Friday, Nov. 28, 5 p.m. Discussion: The Place of Child Guidance in the New Health Service. Openers: Drs. Ian Skottowe, A. A. E. Newth, and Mildred Creak.

LONDON: UNIVERSITY COLLEGE, Gower Street, W.C.—Tuesday, Nov. 25, 5.15 p.m. Dr. Bernard Katz: Propagation of Impulses in Muscle Fibres and the Initiation of Muscle Contraction.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Monday, Nov. 24, 8.30 p.m. Discussion: Tumours of the Bladder. To be introduced by Messrs. E. W. Riches, W. Somerville Mack, and R. W. Reid.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.—Wednesday, Nov. 26, 3.30 p.m. Dr. Mary D. Sheridan: Hygiene in the Nursery and Playroom (illustrated).

ROYAL MEDICAL SOCIETY.—At Balmoral Rooms, Edinburgh, Thursday, Nov. 27, 8 p.m. President's Annual Dinner. At 7, Melbourne Place, Edinburgh, Friday, Nov. 28, 8 p.m. Address by Prof. Ian Aird: The Surgical Management of Peptic Ulcer.

POSTGRADUATE DIARY

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At West Medical Lecture Theatre, Edinburgh Royal Infirmary, Tuesday, Nov. 25, 5 p.m. Dr. J. L. Henderson: The Child's Inheritance.

EDINBURGH ROYAL INFIRMARY.—Thursday, Nov. 27, 4.30 p.m. Honyman Gillespie Lecture by Prof. J. Chassar Moir: November, 1947, and its Sequel.

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, London, W.C.—Tuesday, Nov. 25, 5 p.m. Dr. I. Muende: Pathological Demonstrations.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330-2, Gray's Inn Road, London, W.C.—Monday, Nov. 24, 6 p.m. Cinematograph films. Mr. Geoffrey Bateman: Organic Disorders of the Larynx; Dr. Paul S. Holinger: Bronchial Neoplasms. Wednesday, Nov. 26, 11.30 a.m. Prof. T. Pomfret Kilner: Plastic Surgery.

LONDON CHEST HOSPITAL, Victoria Park, E.—Friday, Nov. 28, 5 p.m. Dr. K. Shirley Smith: Acute Heart Failure.

APPOINTMENTS

Victor F. Lambert, M.D., Ch.M.Manch., F.R.C.S.Ed., has been appointed Professor of Otolaryngology at Manchester University, where he has been Lecturer in Diseases of the Ear since 1935.

Prof. Michael Polanyi, M.D., F.R.S., has been appointed Professor of Social Studies at Manchester University.

Prof. Polanyi graduated in medicine at Budapest, and was appointed Professor of Physics and Chemistry at Manchester University in 1933.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Gideon.—On Oct. 27, 1947, at Lindo Wing, St. Mary's Hospital, to Peggy and Dr. David Gideon, a daughter.

Hargrove.—On Nov. 11, 1947, at Wingfield Nursing Home, Wokingham, to Elizabeth (*née* Corbett-Lowe), wife of Dr. Peter Hargrove, a son.

Jacobs.—On Nov. 10, 1947, at St. Mary, Islington, Hospital, London, to Lusia (Dr. Frank), wife of Dr. A. L. Jacobs, a son.

Lowe.—On Nov. 5, 1947, at Ardencaple Nursing Home, Nunthorpe, Middlesbrough, to Dorothy (*née* Arnott), wife of Dr. G. S. Lowe, a daughter.

Mackenzie.—On Nov. 7, 1947, at Inverness, to Marjorie, wife of Dr. G. K Mackenzie, a daughter.

Southern.—On Nov. 10, 1947, at Queen Charlotte's Maternity Hospital, to Elizabeth (*née* Raphael), wife of Dr. E. M. Southern, a daughter—Judith Helen.

DEATHS

Bristow.—On Nov. 10, 1947, at a London Nursing Home, Walter Rowley Bristow, F.R.C.S., aged 64.

Crowe.—On Nov. 12, 1947, at 38, Bradford Drive, Ewell, Surrey, John Tabuteau Crowe, L.M.S.S.A.

Dickinson.—On Nov. 15, 1947, at West House, Chiswick Place, Eastbourne, William Henry Dickinson, M.B., Ch.B.Ed., Lieutenant-Colonel, I.M.S., retired.

Fraser.—On Nov. 9, 1947, at Fittleworth, Sussex, Margaret Helen Fraser, M.B., B.S., aged 75.

Giuseppi.—On Nov. 10, 1947, at "Trevose," Felixstowe, Paul Léon Giuseppi, M.D., F.R.C.S.

Hendrie.—On Oct. 27, 1947, at 63, Westwood Road, Tilehurst, Reading, Berks, Helen MacDougall Hendrie, M.D., aged 64.

Ritchie.—On Nov. 8, 1947, at 511, George Street, Dunedin, New Zealand, Russell Ian Ritchie, M.B., M.R.C.O.G.

Scholefield.—On Nov. 9, 1947, at Hereford, Robert Ernest Scholefield, M.B., B.Ch.

Shea.—On Nov. 12, 1947, at St. George's Nursing Home, Royston, Colonel Henry Francis Shea, D.S.O., late R.A.M.C., aged 75.

Unsworth.—On Nov. 11, 1947, Jonathan Unsworth, L.R.C.P.&S.I., aged 60.

Waite.—On Nov. 10, 1947, at 24, Portarlington Road, Bournemouth, Joseph Edward Waite, M.B.

Winder.—On Nov. 12, 1947, James Herbert Roche Winder, D.S.O., M.D., Lieutenant-Colonel, late R.A.M.C.

EPIDEMIOLOGICAL NOTES

Dysentery at Wallingford

This explosive outbreak occurred in a mental hospital in the Wallingford Rural District, and by Oct. 31 there had been 362 cases notified. A few secondary cases are still occurring. The total population of the hospital is about 1,400. Between Sept. 22 and Oct. 21 13 cases of acute gastro-enteritis appeared in the same male ward. On Oct. 21 the Public Health Laboratory at Oxford isolated *Shigella flexner* type 103 from rectal swabs from 3 of the 13 cases. This ward contained the worst mental cases in the hospital.

There followed 35 fresh cases on Oct. 21, 71 on Oct. 22, 57 on Oct. 23, and then on successive days: 42, 47, 24, 20, 22, 20, 6, and 4 on Oct. 31. On Oct. 21 the fresh cases were isolated so far as possible, and methods of disinfection of excreta and soiled bedding, etc., and of preparing and cooking food were investigated. None of the staff or patients who worked in the kitchen had been ill recently, but rectal swabs were taken. Rectal swabs were taken from those of the original 13 who were about again, from the 35 fresh cases, and also from the one patient in hospital who had a previous history of dysentery (type unknown).

It was thought that this "explosion" might be due to a superimposed epidemic of salmonella or staphylococcal food-poisoning, but the laboratory failed to find pathogens in samples of food and isolated *Shigella flexner* of the same serological type in swabs from the fresh cases. By Oct. 24 it seemed probable that there was a carrier at work in the kitchen, and therefore the taking of diagnostic swabs was discontinued and all efforts were concentrated on those who prepared food. On Oct. 28 the organism was isolated from two patients working in the kitchen. One of them subsequently developed the disease, but the other remained symptomless throughout. Their removal from the kitchen caused a marked drop in the fresh case rate.

There were only 4 cases in the surrounding district, but each worked in the hospital and had at least one meal a day there. Water, milk, and sewage effluent showed no pathogens. All the cases were treated by sulphonamides, but details of the numbers who have had sulphonamides prophylactically and who have subsequently developed the disease or have become symptomless excretors are not yet available.

The one patient who had a history of dysentery has had two negative swabs, but on Oct. 27 produced a positive swab, and again on Nov. 4. As he has been swabbed several times since his dysentery and the result has been negative each time, his would appear to have been a reinfection rather than the source of the outbreak. The source then is unknown, but the explosive outbreak was probably due to one or both of the patients in the kitchen, who were possibly infected by one of the original 13 cases. There have been no deaths. Investigations are still continuing.

Poliomyelitis and Polio-encephalitis

In the week ended Nov. 8 the decline in the notifications of poliomyelitis 198 (221) and of polio-encephalitis 12 (22) continued. Figures for the previous week are shown in parentheses. The small decline this week gives some support to the opinion expressed last week (Nov. 15, p. 801) that the incidence is likely to remain relatively high for some time. The rate of decline has been fairly consistent for the last three weeks. If it remains the same for the rest of the year then there may still be about 100 notifications a week at the end of December.

Cholera in Egypt

The decline in the incidence of cholera in Egypt still continues. According to the Egyptian Ministry of Health only 88 of Egypt's 4,000 villages are affected. On Nov. 17, for example, there were only 34 deaths and 55 new cases reported. In the week ending Nov. 11 there were 1,895 cases and 1,049 deaths, which should be compared with the peak figures of 4,566 cases and 2,075 deaths in the third week of October.

A careful watch is being kept in this country on passengers arriving by air from Egypt. So far the question of cholera has been raised in only one case. This was a man of 40, flying home from Australia, who on Nov. 10 spent one night in a Cairo hotel. He reached this country by flying boat on Nov. 12 and two days later had all the symptoms of a severe cold. On Nov. 15 he complained of diarrhoea and abdominal pain, and he passed some blood and mucus. Dr. R. Swyer, of the North Eastern Hospital, Tottenham, N.15, informs us that clinically the diagnosis appears to be that of a mild dysentery rather than cholera, but the laboratory investigations are not yet complete.

Discussion of Table

In *England and Wales* the rising trend in the incidence of scarlet fever and measles was continued with increases of 77 and 71. Increases were also recorded in the notifications of whooping-cough 34, acute pneumonia 20, and paratyphoid fever 12. There were decreases in the notifications of dysentery 214, acute poliomyelitis 30, and diphtheria 60.

The rise in the notifications of scarlet fever was due to the northern section of the country; in the South the incidence declined. The only variation of any size in the returns of measles was an increase of 50 in Durham.

The largest rises in the incidence of whooping-cough were those of Yorkshire West Riding 55 and Lancashire 31. A decrease in the incidence of diphtheria was general and the largest falls were Middlesex 11 and Lancashire 11. Of the 15 cases of paratyphoid fever 8 were notified in Leicester C.B. A further 55 cases of dysentery were reported from the outbreak in Berkshire, Wallingford R.D., where 260 were notified in the preceding week.

The general decline in poliomyelitis continued; the largest returns during the week were Lancashire 35, London 20, Yorkshire West Riding 17, Middlesex 12, and Lincolnshire 10.

In *Scotland* there were increases in the notifications of measles 26 and diphtheria 14, while decreases were recorded for scarlet fever 22, acute primary pneumonia 23, whooping-cough 13, and dysentery 10. The largest local rise in the incidence of diphtheria was 9 in Glasgow. Only 2 cases of dysentery were notified in Edinburgh compared with 13 in the preceding week.

In *Eire* infectious diseases were less prevalent than in the preceding week; the only exception was a rise of 15 in the notifications of whooping-cough. The notifications of diarrhoea and enteritis fell by 31. In contrast to the returns for the whole country a small increase was recorded in Dublin C.B. in the incidence of scarlet fever and measles.

In *Northern Ireland* a decrease of 10 was recorded in the notifications of scarlet fever.

Week Ending November 8

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,730, whooping-cough 1,072, diphtheria 219, measles, 2,179, acute pneumonia 571, cerebrospinal fever 39, acute poliomyelitis 198, acute polio-encephalitis 12, dysentery 105, paratyphoid 6, and typhoid 9.

No. 44

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Nov. 1.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1947 (a)	(b)	(c)	(d)	(e)	1946 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	39	—	25	2	—	40	2	13	—	1
Deaths		1	—				—	—		
Diphtheria	178	19	63	12	8	274	34	95	47	8
Deaths	3	—	—	—	—	3	1	1	—	—
Dysentery	126	5	20	—	—	69	15	36	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	—	—	—	—	—	1	—	—
Deaths		—					—			
Erysipelas			29	9	5			56	10	—
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				53					43	
Deaths	51	3	15	10	8	31	2	8	8	4
Measles*	2,052	67	131	207	6	3,374	119	222	54	32
Deaths	—	—	3	2	—	2	—	—	—	—
Ophthalmia neonatorum	41	3	11	—	—	63	7	16	—	—
Deaths										
Paratyphoid fever	15	1	—	—	—	66	2	2 (B)	1 (B)	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	502	39	2	2	3	485	30	6	2	2
Deaths (from influenza)†	16	2	2	—	—	12	1	2	—	1
Pneumonia, primary			215	13				207	24	
Deaths		32		6	4		27			8
Polio-encephalitis, acute	22	3				2	—			
Deaths		1					—			
Poliomyelitis, acute	221	20	46	6	4	25	1	1	6	—
Deaths		—					1			
Puerperal fever		—	10		—		2	13		—
Deaths										
Puerperal pyrexia‡	100	4	8	2	3	117	7	11	1	2
Deaths		—					—			
Relapsing fever	1	—			—	—	—			—
Deaths										
Scarlet fever	1,529	104	286	73	48	1,187	86	313	49	41
Deaths	1	—	—	—	—	3	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	4	—	—	11	—	6	2	—	5	5
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,037	59	41	45	6	1,549	83	188	56	37
Deaths	4	1	—	1	—	8	1	1	—	1
Deaths (0–1 year)	336	38	64	29	22	341	40	60	28	19
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,415	739	590	172	118	4,373	654	620	189	123
Annual death rate (per 1,000 persons living)			12·3	10·9				13·6		
Live births	7,626	1240	954	364	200	8,920	1382	1060	333	260
Annual rate per 1,000 persons living			19·2	23·0				21·3		
Stillbirths	203	34	35			273	38	45		
Rate per 1,000 total births (including stillborn)			35					41		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Prophylaxis of the Common Cold

Q.—*For some years I have used intranasal drops of the following formula with some success in the prophylaxis of colds: Ephedrine, 0.5%; eucalyptol, 0.5%; camphor, 0.5%; castor oil, 0.5%; liquid paraffin, q.s. 100%. Is any harm likely to result from this practice?*

A.—The formula given is similar to that of the compound ephedrine spray of the *British Pharmaceutical Codex*, except that the *B.P.C.* formula contains 1% ephedrine. This preparation is presumably more effective as a spray than as drops. For those who dislike oily sprays, a solution containing 1% ephedrine hydrochloride and 4% dextrose in normal saline may be used as a spray. It is probable that too prolonged use of such a preparation in the form of drops will injure the mucous membrane. According to R. E. Ryan (*Proc. Mayo Clin.*, March 19, 1947) the excessive use of nose drops over a prolonged period has been observed to cause a clinical syndrome in human beings, which may be designated "vasomotor rhinitis medicamentosa." The effects were produced in rabbits which had nasal drops instilled four times daily over a period of ten weeks. Sections of the mucosa showed degeneration, then oedema, and finally metaplasia of the epithelium into the stratified squamous-cell type.

Concentrated Vitamins

Q.—*It is said that certain vitamins are incompatible and should not be taken together in concentrated form, as in the various composite vitamin tablets now widely sold. Is there any truth in this?*

A.—There would appear to be some confusion between the "concentrated form" of vitamins in certain medicinal products and exceptionally large doses of vitamins. While the latter are hardly practicable without the former, it is possible, and very widely customary, to take highly concentrated preparations of some vitamins at physiological levels. There is much scattered evidence to suggest that under certain experimental conditions large doses of one vitamin may affect the metabolism of others at more normal levels, but there does not seem to be any clear evidence at all for antagonistic action between vitamins fed at therapeutic levels or even considerably above this—that is, in the quantities practicable with many vitamin tablets and capsules on the market in this country and elsewhere. It must not be forgotten, however, that feeding one vitamin or a limited number of vitamins to a patient suffering from multiple vitamin deficiency may result in the flaring-up of symptoms due to the absence of an essential nutrient not being replaced by the therapeutic measure. Thus symptoms of beriberi have been evoked by administering therapeutic doses of nicotinic acid and riboflavin to pellagrins. The position of such patients, correctly described as suffering from deficiency disease, is doubtless very different from that of "normal" subjects taking multivitamin preparations as supplements to their ordinary food intake of nutrients.

Flying for Whooping-cough

Q.—*A patient wishes to try the effect of an aeroplane flight on his child who is suffering from whooping-cough. Is there any standard of (a) rate of climb, (b) height attained, and (c) rate of descent? What is the accepted explanation of the beneficial effects supposed to result from this treatment?*

A.—There is no standardized procedure for the treatment of whooping-cough by altitude. There has as yet been no conclusive evidence of its consistent efficacy, except in producing temporary alleviation of symptoms, in tests carried out in this country. A lowering of pressure can more conveniently be produced on the ground in a decompression chamber than in actual flight; a chamber is being used in Paris on a number of cases at present. Cases tested by the R.A.F. during the war were given a rate of climb and descent of 500 feet (152 m.) per minute and kept for one to two hours at 10,000 or 12,000 feet (3,050–3,650 m.) equivalent altitude. The temporary relief at low pressure appears to be due to the lowered friction in the respiratory passages of air at reduced density. No satisfactory theoretical basis has yet been put forward to account for any permanent improvement which may result.

Treatment of Mongolism

Q.—*Is there any new treatment for mongolism? I heard recently of the successful use of some endocrine therapy. Will such treatment benefit a mongol aged 18 months, or is it likely to do harm?*

A.—There is no evidence that mongolism is due to endocrine disturbance, and therefore no endocrine preparation can be justifiably used in treatment of the condition. It should be remembered that all but the lowest grades of mongols will show considerable mental development in the early years of life, and that any "treatment" given is likely to be "successful" in the sense that, after a varying delay, such functions as speech and walking are achieved. In the much over-weight, constipated mongol the use of thyroid extract in a non-specific fashion may produce some physical benefit.

Taste in the Mouth with Dentures

Q.—*Since first wearing dentures fifteen months ago a man aged 54 years has had a persistent sweet taste in his mouth, a dirty brown tongue, at times excessive salivation, and at others a dry condition which is sometimes relieved by removing one or other denture. He has had his sinuses, salivary ducts, alimentary tract, and kidneys x-rayed, and his blood tested for sugar and urea; all were normal. He has had two plastic sets, one vulcanite, and one stainless steel set. I would not care to label him neurotic, but I would like to help him. Can you advise?*

A.—Tastes in the mouth following insertion of dentures are sometimes due to imperfectly vulcanized or processed vulcanite or acrylic resin dentures. The patient in question has tried several sets of dentures, and it would therefore appear that the base has nothing to do with the condition in his particular case. Some patients do not tolerate dentures of any sort well, and any foreign body in the mouth may stimulate an excessive flow of saliva. Scrupulous cleanliness of the dentures, washing them after meals, etc., may be helpful; but if, as is probable, this has already been tried with no result, the patient must either undergo the inconvenience of the symptoms of which he complains or do without dentures.

Eunuchoidism

Q.—*Eight years ago a patient, now aged 25, had testes the size of a pea, with a feminine voice and bodily contours. There were no secondary sex characters, his penis measured 2½ in. (6.5 cm.) and pubic hair was scanty. He was 4 ft. 11 in. (150 cm.) tall. A course of chorionic gonadotrophin was started at that time, but without obvious result. During 1940, following a course of testosterone propionate, the penis became bigger and the patient had marked erections and some ejaculation. In 1942 he again had a course of testosterone propionate, with good results. He was given three further courses in 1943, after which he achieved successful intercourse. Continued treatment with testosterone resulted in an increase in size of the penis almost to normal, moderate increase in size of the testes, a deeper voice, and better bodily development. His height is now 5 ft. 1½ in. (156 cm.). With cessation of treatment libido is disappearing and the patient is losing his self-confidence. Can you suggest further treatment?*

A.—The diagnosis in this case appears to be eunuchoidism—that is, a primary gonadal defect. This is based on the fact that the patient did not respond to gonadotrophic hormone, as he would have done with a primary pituitary defect, but he did respond to testosterone propionate, which increases the size of the penis but not of the gonads and, further, restores or produces potency without, however, fertility. On the other hand, his subnormal height would be more compatible with a primary pituitary defect. The increase in height during treat

ment shows that the epiphyses are ununited, even at the age of 25, and this occurs with hypogonadism which is either primary or secondary. It also illustrates, contrary to general belief, that testosterone in therapeutic doses does not cause the epiphyses to unite, although in small animals, experimentally, it may do so, and premature union of the epiphyses occurs in sexual precocity.

The treatment is substitution therapy, and therefore relapse follows cessation of therapy. The writer has found that insertion of testosterone propionate tablets, at intervals of eight months, is the best treatment, and the usual dose is eight tablets of 100 mg. each. He has also found the best site to be in the subcutaneous fat of the lower abdomen. The technique consists in local procaine analgesia, an incision of 1 to 1.5 cm. down to and through the subcutaneous fat, and the insertion of sinus forceps to make a pocket. The tablets can be implanted either directly with ordinary forceps or preferably through a blunt trocar and cannula. Two pockets in the subcutaneous fat in different downward directions can be made through the same primary incision. One suture is sufficient. An alternative method of treatment is one or two 5-mg. tablets of methyl testosterone by mouth, or allowed to dissolve under the tongue, three times daily.

Estimation of Serum Phosphatase

Q.—*In what conditions is estimation of the serum phosphatase of value? What is the difference between acid and alkaline phosphatase, and what are regarded as the normal ranges of each in adult life and childhood? What are Kay units, King-and-Armstrong units, and Bodansky units?*

A.—Phosphatases are classified according to their origin or the *p*H at which they show maximum activity. Alkaline phosphatase, derived from osteoblastic and osteoclastic cells, has maximum activity between *p*H 9 and 10; while acid phosphatase from prostatic epithelium has maximum activity at about *p*H 4.8. Serum levels run parallel with the quantity of phosphatase-secreting tissue in the body. Serum alkaline phosphatase is therefore at a minimum in the normal healthy adult, and increases whenever bone is being formed or rapidly destroyed. The most important of such conditions are: normal osteogenesis in infancy, childhood, and adolescence; osteomalacia and rickets (including those forms caused by chronic azotaemia or chronic steatorrhoea), hyperparathyroidism, osteitis deformans, and the osteoblastic (as opposed to osteolytic) forms of osteogenic sarcoma. Small and inconstant increases occur also in multiple myeloma, carcinomatosis of bone, and during the healing of fractures. Serum alkaline phosphatase is also increased in obstructive jaundice, and irregularly and to a less extent in other types of jaundice; a level of over 30 King-and-Armstrong units in a jaundiced patient is pathognomonic of obstruction.

Serum acid phosphatase from prostatic mucosa is low in all normal subjects, being increased only when skeletal metastases of a primary carcinoma of the prostate have developed. Treatment with oestrogens, causing fibrosis of the metastases, leads to a reduction in serum acid phosphatase, so that serial estimations of the latter are used to control the treatment. The serum prostatic phosphatase is inactivated by incubation at 37° C. for one hour, or by addition of 25% ethyl alcohol; thus a very precise estimation can be made. Neither phosphatase has been prepared pure, so that their concentration is measured in arbitrary units, which depend on (1) incubation time, (2) nature of substrate, (3) nature of buffer, (4) *p*H of incubation, (5) volume of serum to which unit is calculated, and (6) temperature (always 38° C.). The usual methods of estimation are:

Method	Incubation Time	Buffer	*p*H	Volume of Serum	Nature of Unit	Normal Range	
						Adults	Children
Substrate Sodium Glycerophosphate							
				ml.		mg.	mg.
Kay	48 hrs.	None	7·6	1	1 mg. P liberated	0·08–0·21	0·17–0·38
Jenner and Kay	3 hrs.	Glycine NaOH	8·6	100	" "	3–8	6–20
Bodansky	1 hr.	Veronal	8·6	100	" "	1·5–4	5–12
Substrate Disodium Phenyl Phosphate							
King and Armstrong	30 mins.	Veronal	9·0	100	1 mg. phenol liberated	3–14	10–30
King	15 mins.	Na_2CO_3–$NaHCO_3$	10·0	100	" " "	3–14	10–30
King, acid phosphatase	60 mins.	Sodium citrate—HCl	4·8	100	" " "	1–3	

Infected Burn

Q.—*A woman spilled pure carbolic acid over her forearm and developed a superficial burn which became infected with Pseudomonas pyocyanea. As one area heals another becomes inflamed and breaks down; after daily dressings for eight months the condition remains unchanged. What treatment do you advise?*

A.—Presuming that no question of artefact arises in this case, it is suggested that some form of skin graft is most likely to lead to complete healing. A 1% acetic acid dressing will usually do much to clear up a superficial pyocyanea infection, when, after forty-eight hours' saline dressings, small patch grafts could be applied to the raw areas, dusted with penicillin powder, and fixed firmly by an occlusive pressure dressing for eight to ten days. If the whole area of skin on the back of the forearm is atrophic, some more radical form of plastic repair may in the end be the quickest solution of the problem—for example, a "flap" full-thickness graft from the anterior abdominal wall.

Terminology in Smallpox Vaccination

Q.—*Recently I saw a vaccination record card which stated that in cases of revaccination the result after forty-eight hours should be described as a "reaction of immunity," or an "accelerated reaction (vaccinoid)," or a "typical primary vaccinia." It was stressed that a report of "No reaction" would not be accepted. In the old days we used to describe the results as successful or unsuccessful. What is the "reaction of immunity"; and what is an "accelerated reaction"?*

A.—The form referred to, which appears to be similarly worded to that recommended by Unrra, uses terms which have been the subject of recent discussion. The term "reaction of immunity" has been applied to a local reaction reaching a maximum size on the second or third day and accompanied by elevation and itchiness of the site but without a vesicle. In many quarters this is considered to be unwarranted, because it may be due to weak lymph or even to sensitivity to protein or other substance in the lymph and not the living virus of vaccinia. This is the view taken by the Ministry of Health (see *Mon. Bull. Min. Hlth.*, 1947, **6**, 164). An "accelerated" (or vaccinoid) reaction is when the local reaction reaches a maximum size between three and seven days after inoculation and there is some degree of vesicle formation. This occurs in an individual who has a partial degree of immunity as a result of a previous vaccination.

Erythema Induratum

Q.—*In a case of erythema induratum scrofulosorum is there any effective treatment to clear or prevent the unsightly nodules on the legs?*

A.—The affection is a gummatous tuberculide. Overhaul of the patient or contacts sometimes reveals the source of infection, treatment of which is helpful. Rest and supporting bandages or stockings—warmth and support—are important. Injections of neoarsphenamine, 0.45 g. weekly for six injections, or gold or tuberculin often control the infection for long periods.

Rectal Prolapse

Q.—*What is the best treatment for rectal prolapse? Is an operation likely to effect a cure, and, if so, what is the operation of choice?*

A.—Rectal prolapse is essentially of two types—partial (or mucosal) and complete; in the latter the entire rectal wall is everted and extruded. The former is more frequently a

unilateral condition and rarely exceeds 2 in. (5 cm.) in length. The anal orifice remains central and circular. In procidentia (or complete prolapse) the protrusion may be 6 in. (15 cm.) or more, the anal orifice is frequently eccentric and slit-like, and a finger in the rectum will recognize the thickness due to the presence of the muscular coats. In either case in an adult, particularly if the condition is of long standing, operation offers the best solution. Mucosal prolapse is treated either by excision of the excess tissue, or preferably by ligature—in sections, in a manner similar to that used in treating internal haemorrhoids. In procidentia, amputation of the extruded portion (Miles's operation) is preferable to the many varieties of suspension or fixation. It need hardly be stressed that, before treating the prolapse as such, all possible underlying causes should be excluded.

NOTES AND COMMENTS

Sterilization of Syringes and Specula.—Messrs. JOHN FOSTER and C. H. LE MAY (Leeds) write: It is probable that no instrument is more frequently used in medicine and surgery than the hypodermic needle and glass syringe in their various forms. From time to time tragedies are recorded from poor sterilization, and queries appear in the *Journal* as to the best method of rendering the instrument sterile. In "Any Questions?" (Oct. 25, p. 680) a correspondent who had difficulties with liquor sterilizans and a phenoloid asks whether it is "possible to sterilize a spinal needle satisfactorily without an autoclave." Your reply recommends hot-air sterilization and boiling (presumably in water). If we can accept experiments on hypodermic syringes and needles as bearing on the question and if by satisfactory sterilization the instruments are to be rendered spore-free and left undamaged by the process, we would suggest that until new alloys and glasses are invented the answer should really be, "No."

Hot Air.—Hanne[2] using *B. mesentericus* in 17 hot-air sterilizers found that practically no spores were killed by this method, and that 50 out of 99 needles routinely sterilized by hot air in Berlin hospitals were non-sterile.

Boiling in Water.—While vegetative forms are rapidly killed by boiling in water, it is sometimes overlooked that killing spores by this method is a slow process. Boiling in water also rusts needles and gradually dissolves the glass of the syringe. Experiments in which all-glass syringes were boiled for 70 hours showed losses of weight of the order of 0.14%.[1]

Boiling in Alkali.—Garrod claims that five minutes' boiling in 2% Na_2CO_3 kills all spores.[3] This is a considerable speed-up on water-boiling, but unfortunately this (1) leaves a trace of alkali in the syringe barrel. We cannot say if this would contaminate aspirated fluid seriously, but it might upset certain local analgesics soluble only in acid solution. Harvey, Le May, and Shuttleworth, using the "A.C.10 (surgical)" method (essentially a sterilization by boiling Na_2CO_3), found the alkali effect negligible on "cobefrin," the initial *p*H of 2.8–3.6 being altered only to 4.6–5.2, which is regarded in dental practice anyhow as advantageous (at least two British manufacturers of local analgesic solutions for dental use, which as prepared are at low *p*H, issue "alkalinizing" preparations for use with them prior to injection). (2) Dissolves the glass (0.57% loss after 70 hours in an all-glass syringe), leading ultimately to a leaky piston. (3) Reduces but does not prevent rusting of the needle, which becomes obstructed at a rate which varies with the metal.

Boiling in Alkali and A.C.10.—This method[1 4] is applicable to syringes and protects the needles. Unfortunately the glass is attacked to the same extent as with 2% Na_2CO_3, and a certain amount of oily A.C.10 remains in the barrel and is difficult to remove. The A.C.10 has, however, been shown[1] to be biologically inert and non-irritant. Harvey,[4] however, has found it effective for dental work, though one of us reserves it for sharp-edged ophthalmic instruments, and uses boiling in sodium carbonate alone for syringes. It is true the damage to the syringe is slow, but we are now entering on a period of shortage when such minutiae may be of importance.

REFERENCES

Foster, J., Le May, C. H., and Johnstone, K. L. 1945). *Proc. roy. Soc. Med.*, **38**, 465.
[3] Garrod, L. P., personal communications, 1941, 1942, 1944.
[2] Hanne, R. (1937). *Pharm. Zig.*, Berlin, **82**, 2.
[4] Harvey, W., Le May, C. H., and Shuttleworth, C. W. (1947). *Proc. roy. Soc. Med.*, **40**, 507.

Lead Contamination of Water.—ALAN W. STEWART, D.Sc., F.R.I.C. (London, W.C.), writes: With reference to the question of lead contamination of water (Nov. 8, p. 758) I think the answer is, "No." The amount of lead stated by the questioner is 0.04 part per million. In the U.S.A. 0.1 part per million is accepted. It is probable that 0.5 part per million is safe for domestic use. Others consider this amount too high if the risk of lead poisoning is to be avoided. In the annual report of the Chief Medical Officer of the Ministry of Health, 1934, it is stated that 0.2 part per million may be tolerated, and this would probably be passed as safe. A water containing 1 part per million has hitherto been considered not dangerous provided it is certain that this amount is never exceeded. Other authorities tolerate 1/100 grain per gallon (0.143 part per million). From your reply it would take 50 litres of water to be consumed *daily* to reach the 2 mg. of the strength of lead 0.04 mg. per litre.

"Jugged Hair."—Prof. T. POMFRET KILNER (Oxford) writes: On the cover of the *British Medical Journal* of July 27, 1946, appeared in large print "Vinesthene Anaesthesia for Repair of Hair-lip and Cleft Palate." I expected to see some apology for this mis-spelling or at least a letter from some wag cleverly pulling the leg of the Editor who had allowed it to pass him. Either it went unnoticed or I overlooked reference to it in subsequent issues of the *Journal*. In the *Lancet* of Oct. 18 (p. 588) in an annotation I read, "since the feeding of a child with a double hair-lip is at best tedious. . . ." In the three issues since that date I have seen no correction of this mis-spelling. It is perhaps to be expected that a surgeon who receives a great many letters about this condition from parents and general practitioners should have come across this mistake frequently, but it seems odd that the editors of our two leading medical journals should have allowed it to pass. For twenty years or more I have refused to use the term at all, and I and those who have worked with me have adopted the terminology "cleft lip," first suggested, I believe, by Ritchie, of St. Paul, Minnesota—more descriptive, less inapt, and less likely to lead to incorrect spelling.

*** [Prof. Kilner is right. We must have been thinking of split hairs.—ED., *B.M.J.*]

Examination of Saliva.—Mr. G. E. P. PHILPOTS, D.D.S. (Melbourne, Victoria), writes: With reference to the question and answer (Aug. 23, p. 318) under this heading, as several medical friends have asked me to make comments, it was thought the following remarks might be of interest to your readers. The taking of plenty of milk and a "sufficient" dosage of calcium and vitamin D for the two years prior to the time of being reported would not prevent dental caries developing if the ill effects of an unbalanced diet over a period from early childhood have existed. The proposed test of the saliva for acidity would be of value if it showed an amphoteric reaction to litmus paper. I recall that my friend and teacher, the late Dr. E. C. Kirk, when dean of the Dental School of the University of Pennsylvania, was a physiological chemist and keen student of salivary analysis. In cases similar to that reported above he always (generally) found the (mixed) saliva would give an amphoteric reaction due to the presence of acid sodium phosphate. This reaction indicated a susceptibility to dental caries caused by excessive consumption of refined sugars and starches, which in turn causes an excess of hypothetical H_2CO_3. There follows a chemical reaction with the acid sodium phosphate in the saliva, represented by the following equation:

$$H_2CO_3 + Na_2HPO_4 = NaH_2PO_4 + NaHCO_3$$

Normal saliva is a supersaturated solution of calcium phosphate. When there is an excess of acid sodium phosphate present, such excess is due to the eating of an excess of refined starches and sugars and aggravated by lack of vitamin D. The type of patient mentioned does not respond to diet treatment, but, strange to relate, when the age of about 25 years is reached there seems to be a period of immunity to dental caries, which, however, sets in again a few years later. The excessive consumption of starches and sugars can in many mouths produce a saliva which erodes the enamel, thus allowing the free entry of various decalcifying bacteria always present in the oral cavity to do their work of destruction.

"Cancer Research Society."—A deceased client of Messrs. Farrington and Winterton, solicitors, has bequeathed a one-third share in her residuary estate to the "Cancer Research Society." Inquiries have failed to discover whether this society exists. Messrs. Farrington and Winterton would be glad to receive any information at 12A, Marlborough Place, Brighton, 1.

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